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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Wide World Photos

No Port in This Storm

The 9,000 racing fans who showed up at Ak-Sar-Ben Raceway in Omaha, Neb., one day last year didn't bet on encountering a tornado. Experimenters at the Severe Storms Laboratory in Norman, Okla., are using a minicomputer-based warning system to provide predictions that may someday keep people on their home turf instead of exposing them to nature's wrath. Story on Page 5.

NCSS 32-Bit Minis Can Emulate IBM 370s

By Jeffry Beeler
CW Staff

NORWALK, Conn. — Users can reportedly take advantage of National CSS, Inc.'s (NCSS) full repertoire of IBM 370 series software with a 32-bit minicomputer system that the time-sharing services firm introduced here last week as a potential replacement for the 370/138.

The NCSS 3200 series, which marks the firm's debut as a supplier of stand-alone computer hardware, accommodates any 370 series software package without reprogramming or, in most instances, recompiling because the product line provides code compatibility with the 370's instruction set, company officials said.

Described as the first minis to emulate the 370 family, the five members of the 3200 series are comparable in performance to the 370/138, although the firm insists they provide twice the operating speed in a 5-ft by 3-ft by 3-ft hardware package that is priced in the same range as a typical $150,000 to $500,000 supermini system.

A VPS operating system, which evolved from NCSS' VP/CSS time-sharing operating system, allows the 3200 series to support every major computer language including Fortran, Cobol, PL/I, Basic, APL, Assembler and BAL, company spokesmen said. No rival supermini system can match the breadth of that language selection, the officials claimed.

The operating system also permits the minicomputer family to perform time-sharing, remote job entry and batch processing applications concurrently, they added.

Indeed, software reportedly represents the key to the 3200 series' operations. When NCSS decided to supply its own hardware, the company specified a configuration that could take advantage of its existing software line, which had been developed and debugged in more than five million hours of testing at more than 10,000 user sites, a spokesman explained.

Among its other features, the minicomputer series provides full compatibility with NCSS' nationwide, on-line time-sharing network, which incorporates an Amdahl Corp. 470/V6 and four IBM CPUs — a 360/67, 370/158

(Continued on Page 4)

Also Clears Security Agency

Senate: DES 'More Than Adequate'

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Data Encryption Standard (DES) is "more than adequate" to enhance the computer security of sensitive and personal information in the commercial applications for which it was intended, the Senate Select Committee on Intelligence said here last week.

This conclusion was expressed in an unclassified summary of the committee's "classified" staff study on the matter that resulted from about six months of investigation.

The committee also found the National Security Agency (NSA) has not pressured the scientific community to defer cryptological research nor has the agency tampered "in any way" with the design of the algorithm adopted by the National Bureau of Standards (NBS).

The committee also endorsed NSA involvement in the development of the standard.

Since late last year, the committee staff has interviewed public and private-sector scientists and engineers to determine the truth of allegations that NSA harassed scientists working

(Continued on Page 6)

Texas Library Testing Fiber Optics

By Ronald A. Frank
CW Staff

HOUSTON — When a CRT operator at the city library here transmits data to a nearby processor, a light beam rather than a series of digital pulses is generated.

The CRT at the library is one of nine terminals connected to the CPU over a fiber optical link that uses coherent light instead of electrical signals for data transmission. The library is one of the first user sites to apply fiber optics for transmitting data.

Fiber optics is not now commercially available for data transmission, but the Houston test is considered by experts to be a step in that direction. The fiber optics cable used to link the library's CRTs with a Univac 1900 Computer Assisted Data Entry (Cade) processor was supplied by Univac, according to Alan Albright, manager of remote operations and hardware support in the management information systems (MIS) department of the City of Houston.

The optical cable has been operating for about two weeks without problems, Albright said. The thickness of a lead pencil, it was installed in existing underground conduits by the city. The actual conductor is about as thick as a pin; it transmits data at 2,400 bit/sec.

The fiber optics link is approximately 3,000 feet long, running between a city fire alarm building and the municipal library. The link connects to a standard coaxial cable that runs for 4,000 feet from the alarm building to the MIS center.

(Continued on Page 7)

Analyst, Programmer Jobs Increasing — And Changing

By Ann Dooley
CW Staff

WASHINGTON, D.C. — The job market for programmers and systems analysts, almost negligible in 1960, is expected to grow to half a million workers by 1985 — but not without changes in job functions caused by technical advances and the small computer boom, the U.S. Department of Labor reported in its "1978-79 Occupational Outlook Handbook."

Systems analysts can look forward to brighter employment prospects through the mid-1980s than workers employed in almost any other occupation, the Labor Department reported.

The anticipated high rate of employment was attributed to expanded computer use in areas such as accounting and research and development.

But the technology that has reduced the size and cost of computer hardware, making it accessible to the small user, will create occupational changes for the systems analyst, the Department of Labor noted.

Job opportunities in DP service firms may not grow as rapidly as in the past because small users will be installing their own computers, the handbook noted. This trend will be offset, however, by the small users' rising need for

(Continued on Page 6)

Testing Needs Broader Scope, Users Advised

By Don Leavitt
CW Staff

SAN DIEGO — The traditional view of testing — exercising a program to prove that it is error-free — is erroneous, according to Lois Rose, a senior staff consultant for Yourdon, Inc.

Speaking at a technical session of the Americas Univac Users Association here last week, Rose said it is impossible to demonstrate there are no errors. Beyond that, test cases put together by the developer tend, quite understandably, to be biased in favor of proving the program correct.

(Continued on Page 7)

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Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass 02160. Phone (617) 965-5800. Telex USA-92-2529

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Cat Out of the Bag:

Univac 9000 Users Getting Upgrade

By Don Leavitt
CW Staff

SAN DIEGO — Users of the older Univac 9000 series CPUs will soon have a new upgrade path, according to a Univac official who told a users meeting here the 90/40 CPU will be announced formally this week.

H. Glenn Haney, Univac's vice-president of Worldwide Marketing, told more than 400 members of the Americas Univac Users Association meeting here last week the 90/40 is compatible with the programs and operating system of the 90/30. In addition, it can support twice as much main memory and all the peripherals now available on the 90/30, Haney said.

The CPU in the 90/40 has about 30% more compute power than the 30, he said, explaining later that the increase in power comes from faster access time and "some minor hardware changes." One of these changes provides an "early fetch" of the next instruction to be executed so the system can "look ahead" to what it will have to do.

The processor's faster time does not involve use of a cache memory, he added, although he begged off discussing more details because he is "not really technically competent to do so."

Likewise, although he mentioned that the 90/40 will support a disk upgrade compared with what is available on the 90/30, Haney did not go into specifics.

Nor did the official mention the 90/40's minimum memory size, but he did note its 1M-byte maximum configuration matches the minimum configuration of a 90/60, leaving some users with the impression the 90/40 may be the only system Univac plans to offer between the high and low ends of the 90 series.

Software Compatibility

The 90/40 CPU is completely software-compatible with the highly successful 90/25 and 90/30, utilizing OS/3 and any application programs developed under that environment without any change, Haney asserted. Apparently not even recompilation will be required.

The 90/40 will not support the VS/9 operating environment of the larger Series 90 CPUs — the 90/60, 70 and 80 — but will accommodate OS/4-based work originally developed on the older 9000 series processors.

This should make the system a good upgrade for the OS/4 users who have been limited, until now, to moving either to the 90/30, with no gain in power but an easy switchover, or to the 90/60 and the much more difficult conversion to VS/9, Haney told the 400 to 500 users assembled in the Hotel Del Coronado dining hall.

Release Predictions

OS/4 is apparently on a maintenance-only status with no new functional enhancements. By contrast, a Univac spokesman at an earlier conference session spelled out the company's substantial extensions planned for the next two releases of OS/3 and admitted there would be still another release before next spring's meeting.

Since the Univac official's comments on the 90/40 preceded the formal introduction of the product, he did not announce either the system's costs or its delivery dates. He acknowledged, however, that the system will be demonstrated in Germany this week.

Earlier in his talk, Haney provided another perspective on the 90/40 processor. He noted Univac has abandoned its plan to develop one line of systems into which the company might merge both the Series 90 and the 1100 system users.

The so-called "Roanoke Project" had "very sound" technological roots developed over three years, he said, but Univac now feels users might be uneasy about switching from equipment with which they are familiar.

Instead of the "Roanoke" approach, Univac has now decided on a system of compatible upgrades to extend both of the current lines separately. "Roanoke" technology will be utilized, he said, and compilers compatible with both operating systems will be developed.

OS/1100 for the big systems will be rewritten in an evolutionary way so both types of current users will feel comfortable with it, Haney said, adding he expects "some features" of VS/9 to be carried over to the rewritten operating system. He did not, however, specify which VS/9 features might be included in the transfer.

On the Inside This Week

NEWS

Newcomer Two Pi Launches OEM Business 4
DP-Based System Keeps Eye Out for Tornadoes . . . 5
Spain Working on Privacy Protection Measure 6
View on DDP: Users Like It Anyway 10
Store-to-Door, Univac Both Losers in Legal Suit . . . 11
Detector 'Calms' Mailed Bombs 12
Managing Data Seen Sign of User Maturity 13
Untraceable Data Flows Seen Major Problem 14
NTIA Filling Top Jobs 15
Budget Benefits Seen in Career Training Plan 16
Emerging Nations Must Stretch DP Dollars 17
User-Researcher Communications Gap Decried . . . 19
Programmed Nutrition Data Peps Up Atheletes. . . . 20
DP Course Produces Employable Ex-Prisoners . . . 21

EDITORIAL

Editorial: Refreshing Approach. 22
Human Connection: MIS Director Career Plans. . . . 23
Taylor Report: Tangibility Viewed Differently 23
Part-Time Education Fraught With Choices 24
Front-End Loading Sometimes Only Way 26

SOFTWARE & SERVICES

Bechtel's DP Courses Called Successful 29
Operating System Has Language Independence. . . 30
TI Adds Pascal to Mini's Repertoire 32
'DBMS' Label Stuck on Too Many Packages? 34
Subroutines Back PDP-11 in Lab 36
Program Written as Chess Buff's Research Aid 37
1100/OS Gets Conversational RJE. 36

COMMUNICATIONS

FCC Sparked Services in Canada: Sharp. 39
Terminal-Based Net Details PBX Malfunctions 41
Olivetti TC 600 Terminal Gains Dual Keyboard 44
Auto Parts Inventory Net Improves Service 46
Pay-by-Phone Capability Offered as Turnkey 47
FCC Authorizes AT&T to Add 42 Cities to DDS 46

SYSTEMS & PERIPHERALS

Page Printers 'Revolutionizing' Output 49
Verification Program Cuts Dairy Record Errors 50
Data Entry Set as May Seminar Topic. 51
Scanner Helps Railroad Handle Efficiency Tests . . . 52
Four-Day Seminars to Cover Auditing Basics 63

MINIWORLD

Dual-Function System Eases Forms Generation . . . 67
ACDS Packages Printer for Use With PDP-11 66
Patient Report System Relieves Clerical Burden . . . 69
In-House CPU Cures Hospital's Cash Flow 70
Expandable Minis Handle POS, Business Tasks . . . 72
Odell Desktop Unit Operates Alone or in Network . . 74

MICROCOMPUTING

Four Elements Make Up Minimal System. 75
4K, 6K RAMs Work With 60/10 Offerings 77

COMPUTER INDUSTRY

Service Firms Launch Mini Offerings 79
Reaction to Inroads by Mini Makers 79
Telecommunications Sales to Double by 1967. 60
DP Boosts '77 Business Machines Trade Balance . . 61
Company Secures Mountains of Data in Iron 82
SPC, Transportation Microwave Suing AT&T 84
Zilog Adds 16K by 1-Bit RAM 86

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Newcomer Two Pi Launches OEM Business

By Jeffry Beeler
CW Staff

SUNNYVALE, Calif. — The 32-bit minicomputer introduced last week by National CSS, Inc. (NCSS) was produced by Two Pi Co., a newcomer to the CPU manufacturing field.

Two Pi is a subsidiary of the U.S. division of Philips, the worldwide electronics conglomerate based in The Netherlands.

The firm is now offering a basic version of the system dubbed the V32 to other OEMs, service bureaus and other buyers capable of adding value to the product.

Like its NCSS counterparts, the Two Pi/V32 system runs on the same software that controls 370 series CPUs and operates in the same performance class as the 370/138, according to the firm. It also requires a minimum main memory of 256K bytes, provides built-in air conditioning and executes the complete 370 series instruction set, company officials said.

But unlike the 3200 series, the V32 expands to accommodate up to 4M bytes of main memory, twice the maximum capacity of the NCSS systems and four times the capacity of the 370/138, they explained.

At present, the Two Pi system accepts only stand-alone IBM peripherals. Next year, however, the firm plans to introduce a series of controllers that will permit a V32 CPU to accommodate small disk units, tape drives and other peripherals from competitive minicomputer manufacturers.

When those offerings appear, the V32 will provide about a 2:1 price/performance edge over its IBM equivalent, Two Pi claimed.

Other features offered with the OEM system reportedly include basic and extended control modes, control registers, extended precision floating point registers, error correction codes and an RS-232 Ascii interface for the configuration's operator console.

Capable of supporting up to eight data channels, the V32 uses standard 115 Vac and draws 30A, Two Pi officials said. A byte multiplexer is said to provide eight control unit positions and supports up to 256 low-speed devices concurrently, while accompanying micro-diagnostics allow users to isolate internal equipment malfunctions to the card level.

Deliveries of the V32 system will begin by mid-year. Because it is supplying the system only to OEMs like NCSS, Two Pi declined to issue prices for the V32.

Two Pi is located at 1050 East Duane Ave., Sunnyvale, Calif. 94086.

The Two Pi V32 has internal minicomputer architecture but uses 370 software and operating systems.

NCSS 32-Bit Machines Run IBM 370 Software

(Continued from Page 1)

and two 370/168s — all of which accept 110-1,200 bit/sec asynchronous and 2,000-9,600 bit/sec bisynchronous transmissions, the firm said.

The 3200 series hardware was developed by Two Pi Co. of Sunnyvale, Calif. (see story above).

NCSS officials claim the systems operate 50%-60% faster than the Digital Equipment Corp. VAX 11/780 and Decsystem-2020, Data General Corp. M/600 and its upgrade, Interdata, Inc. 9/32VS, Prime Computer, Inc. 500 and other megamini systems in its performance class.

Typical customers for the NCSS systems range from those who require extensive education and "hand-holding" such as Basic/Four Corp. and IBM System 3 users to customers of Itel Corp. or Control Data Corp., whose CPUs operate in a much higher price and performance range than the 3200 series, the firm said.

A second class of prospective customers will be those in the 370 replacement market, NCSS said, claiming that "a small 3200 selling for $235,000 can match the power of a similarly configured 138 that costs more than twice as much." Company officials, however, downplayed the significance of 370/138 users being potential customers for their equipment.

Two-Level Operating System

The 3200 series' VPS software reportedly operates on two levels. One level, dubbed VP, schedules and allocates resources based on the mix of the users' jobs and the associate priorities, a spokesman explained.

The other level, termed CSS, controls user functions like supervisory services, disk space management, file I/O, terminal I/O and program execution, he added.

The VPS operating system is also said to come with four user software systems — for CRT screen formatting, multiterminal operation, interprocess communication and voice response operation. These systems allow the 3200 series to perform commercial applications like on-line order processing, inventory control, data base inquiry and update, personnel management and payroll, company officials said.

Other software packages offered with the 3200 series include Nomad, a data base management system. EMS, a financial planning and forecasting system; and business accounting systems (BAS), a library of programs that allow users to perform applications such as general ledger, accounts payable, accounts receivable, budget analysis and customer statement preparation. The BAS option adds an extra $5,000 to the 3200's purchase price, an NCSS spokesman said.

Communications Capabilities

Among its data communications capabilities, the 3200 series supports various interactive terminal models and uses bisynchronous and Hasp protocols to accept remote job entry workstations either in a stand-alone or multiprocessing mode, according to a spokesman. CRT terminals that can link to the systems include the IBM 3270, Hazeltine Corp. 1500 and Lear-Siegler, Inc. ADM-2.

The 3200 series systems can also operate as part of a packet-switching network, company officials said.

A basic 3200 series CPU incorporates a 256K-byte MOS main memory expandable in 256K increments to 2M bytes, NCSS noted. The VPS operating system, however, gives the family virtual memory addressing capability of up to 16M bytes, with 8M bytes available to the users' programs and an equal amount reserved for CSS facilities like the VPS/editor, VPS/exec and file system processors.

A basic configuration with a 512M-byte main memory, 200M-byte disk unit, 75 in./sec tape drive, 300 line/min console CRT terminal and eight communications lines costs $235,000. The largest of the basic configurations — the 3248N networking system — costs $400,000.

National CSS is located at 542 Westport Ave., Norwalk, Conn. 06851.

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Using 'Doppler Radar'

DP-Based System Keeps Eye Out for Tornadoes

By Tim Scannell
CW Staff

NORMAN, Okla. — Tornadoes — violent, funnel-shaped windstorms — take an average of 117 lives each year in the U.S. alone, according to the National Weather Service.

In an effort to reduce that death toll, scientists here at the National Oceanic and Atmospheric Administration's Severe Storms Laboratory have developed an experimental minicomputer-based weather monitoring system which, in most instances, has succeeded in determining the formation of a tornado 20 minutes before the funnel touches the ground.

Under the present system, the National Weather Service usually issues tornado warnings based upon reports from spotters, who literally can't tell when a tornado strikes until it does, according to Dr. Richard Doviak, chief of advanced techniques at the Laboratory. Occasionally, he said, the service will issue warnings based on conventional radar reports but these are unreliable because the features they have to identify using their radar are subject to ambiguous interpretation.

The proposed system incorporates a specialized type of radar that observes the wind and rain movements five to six miles up within a thundercloud to detect the formation of mesocylones, the precursors of tornadoes, Doviak said.

The basic radar, fabricated from Army-Navy surplus parts, operates somewhat like conventional radio devices in that it emits an ultrahigh frequency signal and detects that signal as it is reflected off an object. However, the system carries the principle a step further and also measures the Doppler variation, or change in the sound frequency of the returning signal, Doviak said.

By measuring the intensity of the frequency change, the Doppler radar can not only determine what, if anything, is in the area but also which way it is moving and exactly how fast, Doviak continued.

Processing Steps

The signals collected by the Doppler radar are input to a large-scale mainframe that analyzes the data and provides three "moments" or viewpoints of a resolution cell [area]: the mean velocity, the presence of turbulence and the degree of that turbulence, Doviak explained.

The preprocessed information is then fed into a Ling Electronics minicomputer that acts upon the data and presents it in two different ways on a Vector Graphics, Inc. color CRT. First, the minicomputer displays all three principal moments within a resolution cell, and then it details the degree of velocity through varying patterns of color, Doviak said.

The color or measure of velocity within a resolution cell is actually a third dimension of presentation, he explained. The Doppler portrays wind flowing away from the radar and toward the radar, and the color is inserted as a quantitative representation or map of the windfield throughout a thunderstorm, he said.

The radar in Norman works in conjunction with a similar device located in Oklahoma City. Together, both Doppler systems monitor 762 resolution cells spaced 150 meters apart, Doviak noted.

> *'By measuring the intensity of frequency changes, the Doppler radar can not only determine what, if anything, is in the area but also which way it is moving and exactly how fast.'*

Although the system has pinpointed, in advance, every tornado that has occurred in the area, there is a certain degree of inaccuracy associated with velocity measurements over a wide field, Doviak indicated. The accuracy ranges from "less than a few meters per second to maybe a completely inaccurate estimate."

Even though a resolution cell is very large, a single tornado could take up the entire space, Doviak explained. Since the radar only has a .8 degree beam width, "you don't get a [true] measure of the velocity" because that one point may or may not be representative of the actual velocity of the cell."

Even though the system has proved satisfactory in predicting tornadoes and, in some cases, heavy thunderstorms that could lead to flash floods, Doviak doesn't think the National Weather Service will adopt the Doppler radar for quite some time. "I suspect operational prototypes won't be available for three to five years," he said. "Before we go ahead and request money for additional radar . . . from Congress and the appropriate agencies . . . we have to have a basis for requesting those funds.

"We have a pretty good system as it exists now," he continued. "The question is, how much better can we make that system with the Doppler radar?"

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Senate Unit Calls DES 'More Than Adequate'

(Continued from Page 1)

in the field of public cryptology and to assess the role played by the agency in the creation of the federal encryption standard.

Among those interviewed were representatives from NSA, NBS, the National Science Foundation (NSF), the Department of Defense, IBM and the Institute of Electrical and Electronics Engineers (IEEE). In addition, over 200 pages of private and public papers and documents were also analyzed, the summary report said.

In its search for an encryption algorithm that would satisfy the standards responsibilities imposed on the agency by the Brooks Act of 1965 and the computer security requirements of the Privacy Act of 1974, NBS solicited algorithms from the private sector. In consultation with NSA, the bureau determined the algorithm submitted by IBM was the best and should be adopted as the federal government's DES.

Private computer scientists and engineers developing their own encryption systems expressed doubts about the security of that algorithm and the process through which the IBM encryption method was chosen; they also expressed reservations about NSA's involvement, the summary said.

The intelligence committee investigated allegations that NSA exerted pressure on NSF officials to withhold grant funds for scholarly research in public cryptology and computer security, concluding that the security agency exercised no leverage over NSF.

"However, the very uncertainty and ambiguity surrounding cryptology has prompted some NSA officials to express concern to NSF about certain grants with cryptological ramifications and to suggest that NSA be involved in reviewing these proposals," the summary noted. NSF has agreed to permit NSA participation in the decision process leading to the award of these grants "since it views NSA as the only location of competent cryptological expertise in the government," the intelligence committee added.

The Senate committee also denied charges that the NSA directed an employee who was also an IEEE member to write to the institute warning its members that some of their correspondence was in violation of government regulations affecting the publication and export of cryptographic information.

"The committee has determined that Mr. [J.A.] Meyer's letter to Mr. [E.K.] Gannet of the IEEE was initiated solely by Mr. Meyer in his capacity as a member of the IEEE and was not prompted by any NSA official," the summary stated. The committee's report also pointed out that, as a matter of policy, the security agency never confirms the identity of its employees.

"There has been no direct or indirect government harassment of scientists working in the field of computer security," the Senate committee found. In addition, no university has withdrawn library material from its shelves as a result of NSA pressure, as had also been alleged.

No Tampering

Among the charges of NSA impropriety was that under the guise of testing the mathematical formulas IBM submitted to NBS, the security agency "tampered" with the final algorithm in order to weaken it and create a "trapdoor" which only NSA could open.

The intelligence committee determined that only IBM invented and designed the algorithm and that NSA did not tamper with that design. NSA did "convince" IBM, however, that a reduced key size — the string of binary numbers that directs the encryption process — would be sufficient.

The security agency also "indirectly assisted" in the develpment of S Box structures, that part of the algorithm which governs the iterative process. In addition, NSA certified that the final algorithm was, "to the best of [its] knowledge," free of any statistical or mathematical weaknesses.

Finally, the intelligence committee reported that "the overwhelming majority of scientists consulted" about the time necessary to break a message encrypted using the DES algorithm felt the security it afforded was more than adequate for at least five to 10 years for the unclassified data for which it will be used.

The intelligence committee plans no further work in this area, a spokesman said.

Outlook for Jobs Bright

(Continued from Page 1)

analysts to design systems for the small computer and overcome its problems.

The handbook indicated that graduates of computer-related curriculums have excellent job opportunities, as do college graduates with computer-related courses. People without a college degree or those college graduates without a computer background can expect competition from the more qualified applicants.

High Pay for Analysts

Systems analysts historically enjoy high pay as well as good job opportunities, according to the handbook. In 1976, weekly earnings for beginning systems analysts averaged $250 in the private sector, according to data from the Bureau of Labor Statistics and several private firms.

Experienced workers earned $340 to $380 a week and lead systems analysts earned $385 to $400 weekly. Systems analysts earned well over twice as much as the average for all nonsupervisory workers in private industry.

The entry-level salary for college graduates working in federal government was about $180 a week in 1977 and all federal levels were generally comparable to those in the private sector, according to the handbook.

Systems analysts working in the North and West earned slightly more than in the South; they were generally employed in DP service firms and heavy manufacturing rather than in insurance companies or educational institutions.

Programming Jobs on Rise

Programmers can also expect an employment growth rate faster than the average for all occupations.

In addition to jobs that will result from industry growth, several thousand openings will come from the need to replace workers who leave the occupation.

Demand for applications programmers will increase as the rate of automation increases, but employment won't grow as rapidly as in the past because improved software that can be used by a nontechnical person will simplify or eliminate some programming tasks, the handbook said.

In addition, openings for programmers in DP service firms are also not expected to grow as fast because of the small business computer boom. As more firms install their own computers, the demand for DP service firms may slow somewhat, the handbook indicated.

Demand throughout the economy should remain strong through the next decade, however, Labor said.

In programming, too, job prospects will be best for college graduates with computer-related courses and graduates of two-year programs in DP technologies, the handbook noted.

In 1976, the statistics show, 230,000 people were employed as computer programmers working in industries similar to those where systems analysts were found.

The average weekly earnings of programmer trainees in the private sector ranged from $190 to $200 in 1976, according to Labor statistics. Systems programmers earned more than applications programmers, the former earning an average $360 weekly and the latter $310 weekly.

The average salary for lead systems programmers was $385 and for lead applications programmers, $355.

Again, as with systems analysts, programmers earned about twice the average of all nonsupervisory workers in private industry.

In the U.S. Civil Service, the entrance salary for programmers with college degrees was about $180 a week in 1977.

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Users Advised to Take Broader View of Testing

(Continued from Page 1)

A far better definition of testing would be to call it the process of executing a program with the intent of finding errors or, more dramatically, a diabolical process of destroying a system before it can hurt anyone, Rose continued. With that emphasis, there will be fewer surprises for the user and fewer headaches for the technician, she said.

Testing has to be considered as a far more comprehensive set of activities, continuing in various ways throughout the life of a programming project and into the time when the resulting programs have been put into production, Rose said.

There is a difference between testing and debugging, she pointed out. Testing finds the errors, while debugging involves diagnosing the precise nature of the error and correcting it.

External Factors Neglected

Conventional testing tends to work against the internal logic of whatever software is being exercised, neglecting any serious consideration of the external behavior of the program. This means that such things as module logic, program structure and program control are evaluated, but module function and module interfaces, for example, are neglected, according to Rose.

With that focus, the tester may not realize that logic paths are missing, that the wrong function has been implemented, that specifications have been misinterpreted or that the code includes some unpredictable data sensitivities, she warned.

Since the cost of correcting errors — in both time and money — increases with the age of the project, it is important to "build out" the bugs as early as possible, principally by conducting testing throughout the project using a controlled methodology. Virtually any real methodology will help, she noted, although Yourdon "obviously" advocates a structured approach.

Structured analysis, for example, in effect tests the analyst and the user by eliminating the "mind reading" that typifies most current analyses and by providing a precise and concise means of specifying the system.

By using data flow diagrams and other visual aids instead of narrative English, the developers can test for completeness of their work, can maintain the specifications easily and can avoid any need to "freeze the specs" except at the moment of actual cutover to the new system, Rose claimed.

Comparable tools used during the design phase ensure that interfaces are defined precisely. They also protect the system against bug "ripples," enable the planning of testing and implementation in detail and lead to the construction of a void set of test cases, she continued.

Structured programming provides "highly readable" code that is more than traditional "bottom-up" logic. It concentrates on the user function and therefore is more reliable as well, according to Rose.

She noted that a walkthrough or code inspection session by the programmer's peers is one of the best forms of testing "if everyone recognizes the need to evaluate the work critically, without becoming critical of the programmer personally."

The test team, especially for the final acceptance test, may and probably should include people such as auditors, users, analysts and the data center staff, she said. "Assorted diabolical and inimitable" people from elsewhere in the enterprise might be useful but programmers must be excluded, she emphasized.

Texans Testing Fiber Optic Link

(Continued from Page 1)

Four CRTs at the fire alarm building and five at the library are used for remote data entry applications with the Univac 1900 CPU at the MIS center. At each end of the fiber optic link are special converters that translate the digital signals from electrical form to a light form for transmission.

Each end of the half-duplex optical link has a receiver/transmitter unit so data can be sent in either direction with light waves.

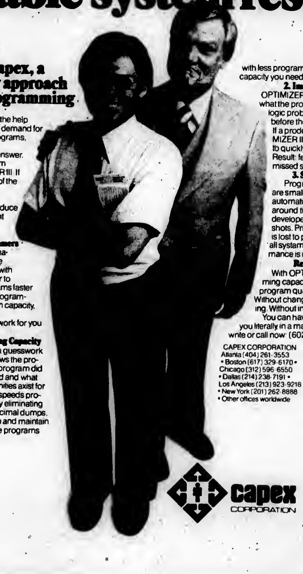
Although described by Albright as a test, the city has plans to install a second fiber optical cable under city streets to connect the airport to the MIS center. The link presently in operation does not use modems and the CRTs appear to the CPU to be operating in local mode, Albright said.

LEDs Make Conversion

Light-emitting diodes (LED) many orders of magnitude brighter than standard display LEDs are used to convert electrical pulses to light pulses, according to Univac. The LEDs use infrared light for greater efficiency; small injection lasers deliver the light waves in extremely high intensity in a straight line to the optical cable end.

At the receiving end, the light pulses are reconverted to electrical pulses by tiny photodetectors made of light-sensitive diodes or transistors. The end result is an optical transmission facility that has compatible electrical properties at each end, Univac said.

The technique is secure because coherent light cannot be tapped and detected by unauthorized persons. Any attempt to tap an optical signal would interrupt the light stream.



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International Dimensions Considered

Spain Working on Privacy Protection Measure

By G. Russell Pipe
CW Staff

MADRID, Spain — "DP power poses serious threats to the private lives of Spaniards," according to a recent headline in the Madrid newspaper *El Pais*. This message belied the long, conscientious work done by parliamentary writers of a new Spanish constitution and by an interministerial committee that has drafted a comprehensive data protection bill.

Spain is preparing to take its place among the other European countries in responding to the privacy issue and its international dimensions.

The draft of the Spanish constitution prepared by an all-party parliamentary group asserts, "Law will limit the use of DP in order to safeguard the personal honor, the integrity and the relationships of citizens." This provision requires legislation for its implementation. A project with this as its objective was initiated in 1974, long before the present government was installed.

An interministerial committee decided in 1974 privacy legislation should be adopted prior to the implementation of a proposed universal personal number. The task of preparing a draft text was given to the National School for Public Administration which together with several experienced members of the government, held seminars and collected documentation, then submitted a draft text to the Prime Minister in 1976.

Reportedly it includes three elements:

- The principles of data protection which include the right of access, limit on the use of personal data to the purpose for which it was collected and the erasure of obsolete data.
- A licensing system involving administrative permits for public and private data banks and the creation of a national register of data banks.
- A section on transborder data.

Transborder Transfers

The transborder provisions call for licensing both the import and export of personal data by any communications medium or vehicle so long as the data's subsequent use is in DP installations or systems.

Precise conditions for foreign data transfers are set out. Article 24, for example, states that prior authorization must be obtained for the transmission of data abroad and that application for the authorization may be made at, or subsequent to, the time a data bank is established.

Article 25 states that the authorization for the transborder transmission of data must specify the data to which it relates, the potential addresses and the means of transmission.

Article 26 states that authorization to transmit data abroad, regardless of when it is granted, must be entered in the national register of data banks.

Article 27 states that the administrator of the data bank must retain copies of all data transmitted abroad that bears a name and address so the relevant authority can carry out any necessary inspections. Article 28 states that data banks outside national territory may not transmit personal data to terminals in Spain without prior authorization from the Minister of the Presidency of the Council.

This authorization will also be necessary for the transmission into Spain of personal data that will be stored in data banks situated in national territory.

Furthermore, a security deposit is necessary before data transfers can be made. The amount of the deposit is to be "determined in each particular case as an indispensible condition for authorization," the draft stated.

Cabinet Approval Needed

The Council of Ministers, or cabinet, must approve the draft law before it can be submitted to the Cortes (parliament). Delays because of other national priorities have postponed introduction of the legislation.

It is understood, however, that these delays are unrelated to the measure.

During the law few months, the political parties have recognized the privacy issue, and public discussion has began which may result in parliamentary amendments, it has been reported.

One expression of concern was an essay printed in *El Pais* by Jose F. Beaumont. He cautioned that what has been called "data processing power" is nothing more than the possibility of centralization and control of information on individuals offered by these data storage techniques and devices.

Personal IDs Feared

In Spain, Beaumont explained, there are at least three large data bases operated by the government; they are used for car registration, taxpayers registration and social security information. Universal personal identifiers have been officially rejected, but they are emerging in the form of a national identity card that bears a personal number. Such cards are used for taxation purposes, automobile licenses and in police files, Beaumont noted.

The computerization of personal records is extensive, according to Beaumont, with more than 70% of the Spanish working people receiving paychecks processed by computers. "DP will have serious social consequences," Beaumont said, "if all the data relating to every Spaniard who is registered in at least 100 files, is interrelated."

But limitations designed to protect privacy have been established for the national census and for business information, he indicated.

Spain, through its own legislative action and as a new member of the Council of Europe, seems to be moving progressively in the privacy field.

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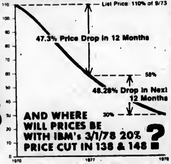

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Spain to Host Conference On World Informatics

Special to CW

ROME — The global future of information, computers and telecommunications will be the subject of a 10-day Intergovernmental Conference on Strategy and Policies for Informatics, set for Aug. 28-Sept. 6. Jointly organized by the Intergovernmental Bureau for Informatics (IBI) based here, the United Nations Educational, Scientific and Cultural Organization (Unesco) and the Spanish Government, the conference will be held this year in Malaga-Torremolinos, Spain.

More than 100 national delegations will debate "policy rather than technical issues," according to IBI Director-General F.A. Bernasconi.

Informatics, sometimes called information policy, is a technique for the more effective use of information for planning and decision making, with the support of computer/communications systems.

Laws in 60 Nations

More than 60 third world countries have adopted specific laws and created authorities over planning, procurement, development of indigenous industries, an interface with telecommunications and sociocultural implications of informatics applications.

At a recent symposium in Washington, D.C., Bernasconi said informatics is important to the U.S. because the equipment and services are a major source of U.S. exports and developing countries are the growing market for American sales.

According to U.S. state department officials, the U.S. will send a delegation to the conference. Whether the conference will strengthen national commitments to informatics and drafts a program of international cooperation, remains to be seen.

Conference Agenda

The IBI General Assembly has called on the conference to consider:

- Accelerating the transfer and application of computer/communications technology to developing countries with special regard to their adaptation to local conditions.
- Initiating programs in all countries for indigenous capabilities in information resources.
- Encouraging developing countries to take a more active substantial role in formulating international data transmission policies.
- Integrating informatics with major national educational, industrial, communications and social policies.
- Recognizing the power of informatics in affecting national sovereignty and democratic control over the destinies of nations.

The conference will explore the relation of informatics to the new international economic order and may call for a new world information order. "If there is an information war coming," one U.S. DP executive said, some of the first volleys may be fired there." Accordingly, several American multinational corporations are anxious to have observers at the conference.

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View on DDP: Users Like It Even If It Can't Be Defined

By Ann Dooley
CW Staff

ANAHEIM, Calif. — Many DPers see distributed data processing (DDP) as the wave of the future and the best thing that could happen to a user, but at the same time they cannot agree on what DDP is, Thore Thorensen, a consultant for Advanced Computer Techniques, Inc. told a recent Computer Expo '78 audience here.

The state of the art in the computer industry has changed significantly since the early '60s, when data processing was concentrated in one large-scale general-purpose computer, Thorensen noted. This approach maximized the cost-effectiveness of computing hardware.

Eventually terminals appeared enabling a remote user to be connected to the central data base. But this approach was still fully centralized since the terminal's only function was transmitting data and not processing, Thorensen said.

In the early '70s, a revolution occurred and it became a sin to use a large computer when a smaller machine could do the work, Thorensen recalled. In this decentralized environment, two or more machines would replace one large one.

These physically dispersed and stand-alone computers were advantageous when a business was spread over a large geographic area. The computers could be identical machines spreading the load, doing identical or dispersed duties, Thorensen said. It was even possible to put the small computers in the same place and still be decentralized, he pointed out.

The decentralized method was not introduced by the large manufacturers but by the independents, and it was based on the fact that several small machines cost less than one large one, he explained.

The present distributed environment is midway between the centralized and decentralized approaches; there are still several small machines, but they are now connected, he said.

CW Photo by A. Dooley

Thore Thorensen

Elements of a System

Outlining the elements of a DDP system, Thorensen said they include at least one CPU — the processor and primary storage, peripherals, communications equipment and data entry equipment.

The software usually includes standard control functions, support functions and applications customized to the user's specifications and data. The DP staff includes operators, programmers, support staff and management, Thorensen said.

Two DPers might look at the same distributed system and disagree about whether it was distributed, Thorensen said. A usual definition of DDP includes more than one processor with some or all of them handling different functions at one or more locations. The processors would be physically interconnected and would adhere to some common standard of communication, according to Thorensen.

What occurs is a "cooperative autonomy"; the machines are as independent as in a decentralized environment, but also work together, he noted.

Hazy Future

Although a data base is often thought of as a centralized, unified concept, a distributed system can disperse the data base locally near each user, according to Thorensen. However, this dispersal can cause control problems, he noted.

It doesn't really matter whether a system qualifies as "distributed" not as long as it works, Thorensen told the audience. However, if DDP is the wave of the future, it is a very hazy one, Thorensen cautioend.

The important question is what DDP provides for the user, he pointed out. DDP system performance can provide throughput in batch or response in on-line environment, he said. A facility situated closer to the user cuts communication problems and costs and can permit multiple users to multiple functions on one system, he added.

Students Named Award Winners

NEW YORK — Four students have been awarded scholarships sponsored by the National Science Foundation that will enable them to attend the Association for Computing Machinery's History of Programming Languages Conference in Los Angeles June 1-3.

The four, selected by the conference's organizing committee, are John M. Favaro of the University of California at Berkeley, Bruce I. Galler of the University of Michigan, Helen M. Gigley of the University of Massachusetts and Richard J. Miller of the University of Illinois.

The students were chosen on the basis of their knowledge of programming languages, their interest in history research and their commitment to participation in selected conference sessions.

Sponsored by the ACM's Special Interest Group on Programming Languages (SigPlan), the conference is intended to provide information on the early development of programming languages, to preserve the history of the languages.

Vendor Guilty of Breach

Store-to-Door, Univac Both Losers in Legal Suit

By Howard Karten
CW Staff

SACRAMENTO, Calif. — Store-to-Door Supermarkets, Inc. (STD) and Univac were both winners — and losers — in a suit and countersuit decided recently in the U.S. District Court for Eastern California here.

STD, the plaintiff, was awarded $102,000 from Univac for breach of contract while Univac won $245,000 in a countersuit for monies due from the lease and servicing of a Univac 9400 system [CW, Dec. 5].

However, it is not clear who the net financial winner of the case is, since STD is now defunct and has no assets. Further, Univac is estimated to have spent close to $1 million — and possibly more — in pressing the suit.

Novel Concept

STD was designed as a novel concept in grocery retailing. The original plan called for customers to phone their orders to clerks in a warehouse, who would then enter the orders into a Univac 9400. A printed list generated by the system would then have been used by other clerks to assemble the order for delivery the same day.

In its suit, STD contended that it experienced problems arising from computer failures from its first day in operation and that within three days it was forced to go to next-day delivery. STD went out of business two months after that, claiming computer difficulties as the reason.

Among the allegations made by STD in its suit against Univac was that Univac personnel had insufficient experience and capability to do the project and that they were, in fact, Cobol trainees inexperienced in on-line applications.

In its countersuit, Univac sought to recover approximately $1.3 million which it claimed STD owed for contracted software, a one-year management contract and a five-year lease on the hardware.

Charles D. Chalmers, the attorney representing STD, said the jury's award to Univac was inconsistent with its finding that Univac was guilty of breach of contract. Although he did not know if STD plans to appeal the verdict, he said he will move for a new trial since he believes Judge William H. Orrick Jr. made some judicial errors in the case.

The errors alleged by Chalmers include Orrick's rulings on admissability of evidence and errors in his instructions to the jury.

Bay State Board Gives Burroughs Promis Contract

By Brad Schultz
CW Staff

BOSTON — The Proposal Review Board of the Massachusetts Committee on Criminal Justice (CCJ) has voted unanimously to allow implementation of the first statewide Prosecutor's Management Information System (Promis) by Burroughs Corp.

The vote agreed with the earlier recommendation of a CCJ bid protest hearing officer [CW, April 3].

Burroughs can now go ahead with the $815,000 deal it won from the Massachusetts Supreme Judicial Court (SJC) last November to support the software package with its B1800 series hardware.

Refutes HIS Objections

Responding to a protest by Honeywell Information Systems, Inc., the CCJ held a hearing to consider the arguments of HIS and CCJ General Counsel John L. Tobin against the SJC and Burroughs. HIS and Tobin claimed that the SJC DP center evaluation team improperly evaluated responses to its August request for proposal (RFP) and that the Burroughs response failed to meet the RFP requirements [CW, March 6].

The hearing officer refuted these contentions in her ruling on the matter, however, recommending the Review Board allow the Burroughs proposal.

The runner-up $1.2 million HIS bid, along with those of eight other vendors, was rejected by the evaluation team. HIS was the only contender for the award to mount a sustained protest.

Call for Papers

FOURTEENTH MEETING OF THE COMPUTER PERFORMANCE EVALUATION USERS GROUP (CPEUG), Boston, Oct. 24-27, 1978.

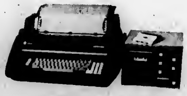
The theme of the conference will be the role of measurement, evaluation and prediction technology in the major areas of the DP life cycle: planning, acquisition/development and control. Topics include workload modeling, benchmarking terminal systems, installation auditing and performance metrics, standards, prediction and management.

Send two copies of abstracts, summaries of tutorials or summaries of workshops by May 15 to Terry Potter, Program Chairman, Digital Equipment Corp., ML 3-3/E67, 146 Main St., Maynard, Mass. 01754.

COMPCON FALL '78, Washington, D.C., Sept. 6-8, 1978

The program will focus on communications networks. The Short Notes session will provide an opportunity to present new work or applications; the presentations are restricted to five minutes.

To participate in the Short Notes session, submit a 250-word summary by Aug. 1 to Shirley Ward Watkins, National Bureau of Standards, Technology B212, Washington, D.C. 20234.



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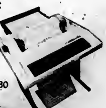

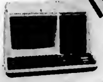

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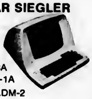

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Takes Electronic Measurements

Detector 'Calms' Mailed Bombs

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — The increase in terrorist activities over the last few years has prompted development of a computer-based letter-bomb detector.

The device was designed by Dr. William Gregory, a physics professor at Georgetown University and director of the school's Technology Transfer Program, and two colleagues who do not wish their names disclosed for security reasons.

It was given the acronym Calm — Capacity, Altitude, Lbs., Metal — to denote some of the particulars it measures to detect bombs.

System Description

Calm consists of a box attached by cable to a cabinet containing a CPU. Currently a Digital Equipment Corp. PDP-11 or a Computer Automation, Inc. Alpha LSI-2 is used. The box is fronted with a two-foot slot into which the mail is fed. Inside, various electronic measuring devices, which Gregory would not describe to avoid giving away the system's mechanism, measure such properties as weight, size and amount of metallic content.

The data from each measuring device is transmitted to the CPU, which is programmed to compare the characteristics of the piece of mail with those of harmless mail.

If the probability of the letter being dangerous is high, a warning signal is sounded. The danger level signal can be adjusted by the user, but at the recommended level the system sounds a false alarm only one or two times for every 10,000 pieces of normal mail examined, Gregory said.

Although the program is written in Assembler, a user can interrogate the CPU in Basic to learn the specific properties of a piece of mail. The entire process takes from 5 msec to 10 msec to complete and is designed for use by nontechnical personnel.

There are no similar devices in existence, he stated. Those devices that do exist, but are not accurate, include a very expensive nuclear-based machine, X-ray machines and metal detectors, he said.

Calm took approximately two years and $150,000 to develop. The price is currently $45,000 to $50,000, although that should go down as the number manufactured goes up.

Three systems are currently being used. One has been installed in a government agency for the past 14 months without any problems, he said.

The entire market for such a machine, which would consist mainly of multinational corporations, would be about $25 million domestically, he estimated.

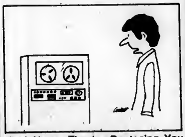
Book Discusses Government DP On Local Level

NEW YORK — *Computers and Local Government: A Manager's Guide* is being offered by Praeger Special Studies here.

The book is described as a practical guide to developing and operating an urban information system.

According to the publisher, the book is based on a survey and analysis of literature in the field.

In hard cover only, the book costs $12.50 from Praeger Special Studies, 200 Park Ave., New York, N.Y. 10003.



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Focus on Processing Not Enough

Managing Data Seen Sign of User Maturity

By Don Leavitt
CW Staff

SAN FRANCISCO — As an organization matures in its experience with DP, it will tend to shift its concern from managing processing to managing data, according to consultant Richard L. Nolan.

The changeover begins as the organization's application library and the cost of processing the programs has gone out of control, the former Harvard Business School professor told attendees here at the recent Conference on the New EDP Economics, sponsored by International Data Corp.

To bring those costs back under control, management .typically begins charging users for services. But, Nolan noted, the uses don't understand "and certainly can't do anything to limit their use of" EXCPs, disk access and other such "very arbitrary" billing units.

Once billed, the users begin to get seriously concerned about what's going on in the DP department. At the same time, perhaps because of user pressure, the DP staff has acquired a data base management system and has begun to move applications over to it, the consultant continued.

All of this activity does not in fact break the upward climb of DP costs, Nolan acknowledged, but it does finally bring the DP operations to the point that they reflect quite accurately the operations of the organization as a whole.

The accounting for services provided in an enlightened environment is expressed in terms meaningful to the user. DP management feels competent to set up standards and controls to limit excesses: the DP organization focuses primarily on data administration, he said.

In this mature setting, the application "portfolio" is essentially stagnant, Nolan said, but that is not a real problem since the systems in place are workable ones that suit the organization. Growth is well planned and all concerned are working smoothly together.

Identifiable Stages

Many organizations may be in that happy state by the late 1980s, he said, but there are identifiable stages of growth through which each must pass to reach maturity. Costs trace an S-shaped curve if the stages are plotted across a sheet of paper.

Costs are low during the initiation stage and there is good front-end planning for the first functional cost reduction applications. Whatever department utilizes those applications usually houses the DP organization, Nolan noted.

DP management control is lax or nonexistent at that time and most users have a "hands-off" attitude toward the whole idea of DP, he said.

"Contagion" was the word Nolan used to describe the second stage which he said is driven by a desire to get as much on the computer as possible. The application portfolio proliferates but the programs are poorly done. Programmers become identifiable. DP management is more lax and users are superficially enthusiastic, Nolan recounted.

Costs skyrocket until the third phase, which sees the onset of consolidation and control — or attempted control — of the chaos created earlier. Middle management takes shape in the DP organization and formalized project plans become the management style.

This is the time end users begin to see the strange billing units over which they have no possible control and which lead to the shift from management of processing to management of data. Data is something users feel they can understand; processing is outside their scope of interest, Nolan said.

NFPA Enhances Fire Reporting

BOSTON — The National Fire Protection Association (NFPA) has revised its planning and reporting system for fires and similar incidents by incorporating recommendations from 31 communities now using the system.

A computerized data management tool, the Uniform Fire Incident Reporting System (Ufirs) is geared to any municipality or country in which the fire department responded to at least 250 calls per month, an NFPA spokesman said.

Community Data Base

Ufirs builds a community data base from which information can be analyzed to measure the extent of any local fire problem; support budget requests and code changes; evaluate code enforcement programs; guide fire prevention programs; plan for future fire protection needs; improve allocation of resources; and study fire control activities, according to the spokesman.

Ufirs can also be applied to management of community police, water, planning, building, health and sanitation, electricity and gas and tax assessment, he noted.

Ufirs costs $3,250 from NFPA at 470 Atlantic Ave., Boston, Mass. 02210.

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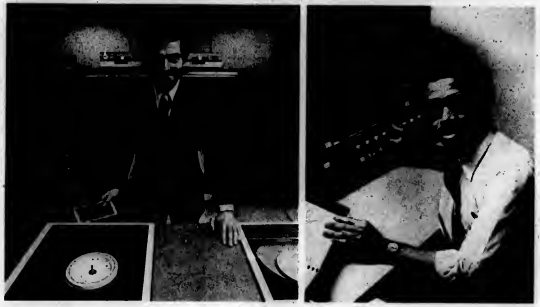

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Untraceable Data Flaws Seen Major Problem

By Marguerite Zientara
CW Staff

TORONTO — The major problem surrounding computers in industry is that inaccurate or invalid information may be put into a data bank, and there is no way of knowing or ascertaining who input the information, according to John A. Morand, a lawyer and director of Comtech Group International Ltd. here.

Morand spoke at the recent Data 78 telecommunications conference here in a session that also included a presentation by Inger Hansen, a lawyer and Canada's recently appointed human rights commissioner.

Morand said that despite passwords and access codes, a "brilliant individual" can crack any data file. If someone were very determined and had the time, he could go so far as to apply for a job, take it and learn the security methods, then leave the firm and access its files, he said.

Privacy should be protected in six major areas, he said. First, citizens must be protected from each other, from corporations and from government. Further, corporations must be protected from corporations and from government and governments must be protected from other governments.

Morand then introduced Hansen who discussed Part IV of the Canadian Human Rights Act, which she described as a total reversal in government policy regarding personal information.

The act, which was passed by Parliament in July and became effective March 1, gives the individual citizen the basic right to find out "what the government has on you," Hansen said. The act allows a citizen to apply for the correction of any information with which he does not agree. If that request for correction is denied, there is at least a notation that the request was made.

If the request notation is not acceptable to the citizen, he can apply to Commissioner Hansen, who in turn can report to Parliament, urging the appropriate minister to accept her recommendation and make the change in the record, she said.

A citizen also has the right to know to what administrative use the information has been put, Hansen said.

Prohibits Nonderivative Uses

The Human Rights Act also prohibits nonderivative use of personal information except when otherwise provided by law or when the individual doesn't object. For example, the government is not required to consult a citizen if the information about him will be used for statistical purposes; however, if the information on a citizen will be passed from one governmental agency to another, a citizen has a right to complain, she explained.

Under the act, the government is required to publish a yearly phone-book-sized index to be placed in every major post office in the country. The index will be organized by governmental departments and will indicate any data banks containing personal information maintained by those departments, Hansen explained.

If a person wants to see that portion of a data base pertaining to him, he must fill out an application indicating the identifying number of the data bank and send it to the government department. The department then has 30 days in which to either respond with the information or simply acknowledge the request, in which case it has 30 more days to respond with information, Hansen said.

The department may send copies of the information or arrangements may be made, in the case of a large file, for the individual to appear to examine the file and select sections he may want copied. The service is now free, but a charge may be incurred if an individual asks twice for the same information, Hansen said.

Of the 1,500 data banks maintained by governmental agencies in Canada, Hansen said, 22 are exempt from disclosure and those are concerned with either the country's security or with criminal investigation. In the case of the exempted files, a citizen is not allowed to even know if information about him is included in it.

Since being appointed human rights commissioner on Oct. 1, Hansen has had wide powers of investigation, but no real power to act, she said. She acts as a mediator, examining fairly and advising forcefully and consistently if an individual is not receiving information to which he is entitled.

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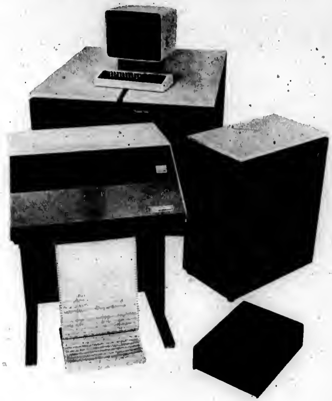

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NTIA Filling Top Jobs

WASHINGTON, D.C. — High-level jobs in the Commerce Department's National Telecommunications and Information Administration (NTIA) are now being filled, according to Administrator Henry Geller.

Leland Johnson will come from the Rand Corp. to be deputy associate administrator for policy analysis; the current assistant director of the Office of Telecommunications Policy's International Communications Office, William L. Fishman, will be Johnson's deputy.

William Lucas will also leave Rand and will become associate NTIA administrator for telecommunications applications. The OTP assistant director for government communications, Donald M. Jansky, will be associate administrator for federal resources under the new agency. OTPer Stanley Cohen will be Jansky's deputy, Geller said.

A 'Centsless' Situation

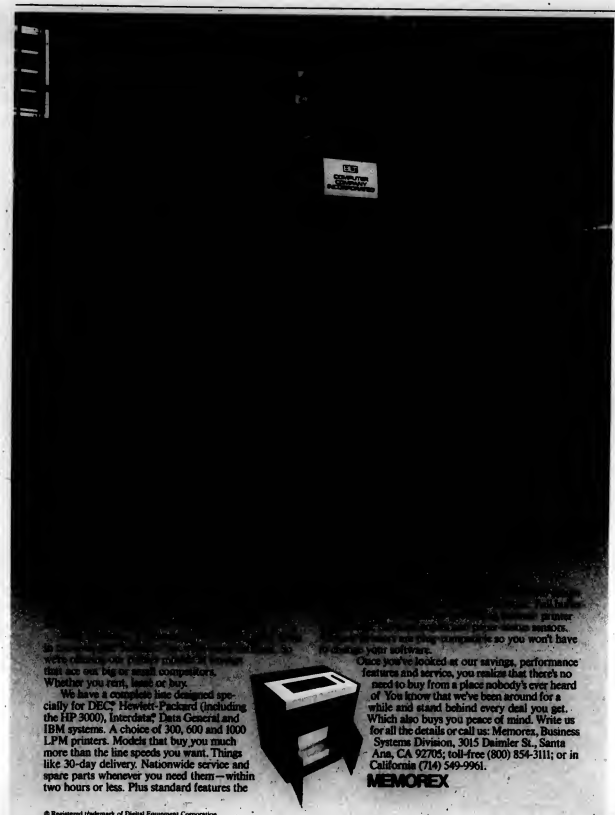
By Tim Scannell
CW Staff

PROVIDENCE, R.I. — Anthony DiCostanzo was given a firsthand lesson on impartiality and common "cents" when he was notified here by the city's computer to pay off his automobile taxes or face penalties of 8% a year beginning April 25.

The problem surfaced when DiCostanzo received a bill stating that he had underpaid the city tax on his car by one penny. "I was amazed," DiConstanzo said. "It cost them 13 cents to mail it, plus the [work of many] people."

Acting City Solicitor Ronald Glantz, considering the economics of the situtation, decided to pay the penny himself and appease the penurious computer. "We send out approximately 40,000 bills and this happens maybe 100 times," Glantz stated. The computer will bill anyone, no matter how little he owes, and "the clerk of the county usually pays it rather than send out a statement," he said.

Glantz noted, however, that even though DiCostanzo's bill is paid, he shouldn't expect a receipt. "That costs 13 cents," he pointed out.



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Budget Benefits Seen in Career Training Plan

By Don Leavitt
CW Staff

SAN FRANCISCO — "Career planning" in too many installations consists of assigning people to training courses to solve immediate needs. With such an approach, it's not surprising that training budgets are typically the first to go in a crunch, consultant Norman Carter said at a recent Computer Expo 78 workshop here.

The president of Development Systems International advocated a more comprehensive planning program. It might cost more to implement, but it will have a number of benefits, Carter said.

Giving people a clear picture of how they can advance within an organization, what skills are needed at each position and how those skills can be acquired does not amount to "a plea to double the training budget," but one to use it more efficiently, he said.

Intelligent planning might even lead to a budget cut, he noted, adding that in his view on-the-job coaching may be more effective and certainly cheaper than classroom courses. In any case, a serious approach will lead to better measurement of how well training expenditures are being used, Carter continued.

In answer to a question from the audience, he said development of a substantial career pathing plan generally takes nine months to a year "almost regardless of how big or small the organization." Typically the effort requires one full-time person and one part-timer with additional help "up front" if the project is for a big staff.

With a real plan, training would be beneficial to both the individual and the organization as a whole. It might make an employee better able to cope with a current assignment or better equipped to move to a new one, he said.

Fringe Benefit

Yes, some training can be used as a fringe benefit without any direct applicability if it is the type of training the employee feels he wants, Carter told another questioner. But he warned the skills learned in such training should be put to use within six months or the training would be a waste of time.

That warning applies to any training, "fringe benefit" or not, he said, urging the use of small classes of people who have an immediate need for whatever is being taught. There is no purpose, he contended, in trying to teach "everyone in the whole department" something as detailed as JCL coding.

Unlike training, promotions should never be used as fringe benefits. Promotions should entail real changes in work to be done and, whenever possible, changes in work location, Carter responded to still another query.

Some organizations "promote" people from Programmer Level 1 to Level 2 just to give them more money, but that's a bad practice, he said. "Let's separate money and promotions. Someone who deserves a raise for what he is doing should be able to get the additional money without being forced out of a work slot he likes."

In the same vein, he noted later, programming is not necessarily the most sensible path out of operations work. There is a feeling nowadays that a move into direct user support areas might be more appropriate.

In any case, it's probably best to encourage all employees to develop within their own jobs — if that's what they want to do — and to talk about their interests and potentials on a one-to-one basis with their respective managers.

Summer Day Camp to Emphasize Hands-On Computer Instruction

By Brad Schultz
CW Staff

ORANGE, Conn. — A summer day camp billed as a new concept in computer education and recreation for junior and senior high school students will convene here in July with donated hardware from Wang Laboratories, Inc.

Campers will learn to program in Basic and emphasis will be placed on a "hands-on" approach, according to Dr. Michael Zabinski, a Fairfield University professor of physics and engineering who will direct the camp's two half-month sessions.

"Our philosophy is to motivate students by presenting material in exciting, meaningful ways with examples they can relate to and identify with," Zabinski said, noting the campers will be able to play various games routines and will probably visit the computer facilities of nearby Yale University.

Zabinski was inspired to develop the "Computer Day Camp" because "computers are fast becoming an important educational consideration as students need to be prepared to live in a computerized society.

Zabinski, shown introducing students to interactive programming, has planned a summer day camp to provide computer instruction to junior and senior high school students.

"Both parents and students are aware of the computer revolution and are certainly interested in computer literacy," Zabinski said. "The purpose of the camp is to provide students with ample opportunity to use the computer for simulations, modeling and other instructional applications.

"In the process they come to understand the potential as well as the pitfalls involved in using computers. [Camp] units in social studies can concentrate on the uses and abuses of the computer and the resulting impact on society.

"The notion that students tend to learn from the sum total of their experiences can be realistically and effectively applied to the teaching of computer literacy," he said.

Franchising In Mind

The upcoming summer sessions are seen by Zabinski as a pilot for franchising the camp in the future. Zabinski and Wang may decide to market the associated documentation and instruction with Wang's hardware and software, he said, noting this prospect is contingent on the success of this summer's pilot.

Wang donated its products to the camp "because we are very interested in the educational marketplace ... and we'll get exposure among the young students," Wang sales manager Robert Carr said.

The vendor is donating five PCS-2 CPUs, each with 8K bytes of memory, and one 16K-byte WCS-20 CPU. All units will have dual diskette drives and CRT terminals. Wang will also provide one card reader and one line printer, Carr said. Basic is hard-wired into each unit.

The camp will cost $190 per camper per two-week session, including books and supplies but not including lunch. Enrollment will be limited to 20 campers per session, with Zabinski and two local high school teachers serving as instructors.

The camp will be held daily from 9 a.m. to 4:30 p.m. at Amity Junior High School here in Orange. The first session will run July 5-18, the second July 19-Aug. 1.

Additional information on the camp is available from Zabinski at 382 Hitching Post Drive, Orange, Conn. 06477.

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Automating to Manage Growth

Emerging Nations Must Stretch DP Dollars

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The computer and communications concerns of the U.S. are very remote from those of the developing countries, S. Karoui, president directeur general of the Centre National de L'Informatique in Tunisia, told a symposium of representatives from the U.S. and developing nations here recently.

Caught up in the effort to acquire computer and communications systems without squandering scarce capital resources and in the attempt to use and maintain these systems efficiently, developing nations like Tunisia are a long way from encountering the "information age" the U.S. has entered, Karoui said.

Sponsored by the American Association for the Advancement of Science (AAAS) and the Intergovernmental Bureau for Informatics (IBI), the symposium dealt with "informatics," or computer and communications technologies, for national development.

Mexico and Zaire also sent representatives to the conference to hear what the Americans had to say and to voice their frustrations with and hopes for the further development of these technologies in their nations.

Representatives from the embassies of Brazil, the Gabonese Republic, Italy, Chile, Iran, France, Morocco and Argentina attended the symposium as observers along with U.S. government and industry members.

"Developing countries have many urgent and acute problems. In most cases their independence is recent. Everything is a priority," Karoui said.

"Informatics is a must to properly manage all the functions necessary to ensure the growth of developing countries," he added.

Started on Wrong Foot

Karoui contended that most developing nations started off on the wrong foot with computer and communications technologies. "We started too late. The first computer was introduced in Tunisia in 1968," he said.

Available applications were limited to such tasks as billing and payroll. "We were told to buy an IBM 370/135 or a 370/145 to handle payroll for 2,000 people. Informatics was initially very wasteful for our countries," Karoui stated. "And the developed countries did not help us at all," he added.

Dondi-Bungu, a member of Copiz, Zaire's Permanent Council of Informatics, reiterated Karoui's concern over the exploitation of developing nations by major computer manufacturers. He likened the outflow of his country's capital to pay for these machines to "hemorrhaging" and said Zaire has centralized computer acquisition in order to stop the waste of scarce resources.

The developing countries are not interested in manufacturing their own systems. "The manufacturers are too strong. We don't intend to waste our time, energy and money on building computers. Our concern is to use computers as management tools," Karoui said.

Both Dondi and Dr. E. Melrose, Director d Ciencia e Investigacion Coordinacion General Educacion Superior, Ciencia y Technologia in Mexico, expressed the need to train more of their own countrymen to be systems analysts, programmers and systems engineers.

High National Priority

Transfer of technology must go hand in hand with transfer of knowledge, Dondi said. "Education and training in informatics is a high national priority," he added.

With the help of the IBI, which considers itself the only intergovernmental organization that promotes the introduction and use of information technology in developing and developed nations, Zaire is establishing a national institute for informatics, Dondi stated. He said his country will soon ask for the cooperation of the developed nations.

Dondi also suggested that many of the developed nations are overcomputerized and may find our central acquisition policies helpful," he said.

Karoui indicated he expects Tunisia to have a policy on training for computer specialists by October. Education for those who will maintain Tunisia's computer systems is a must, he said. "We want less dependence on the builders and suppliers of computers."

Sharing Problems

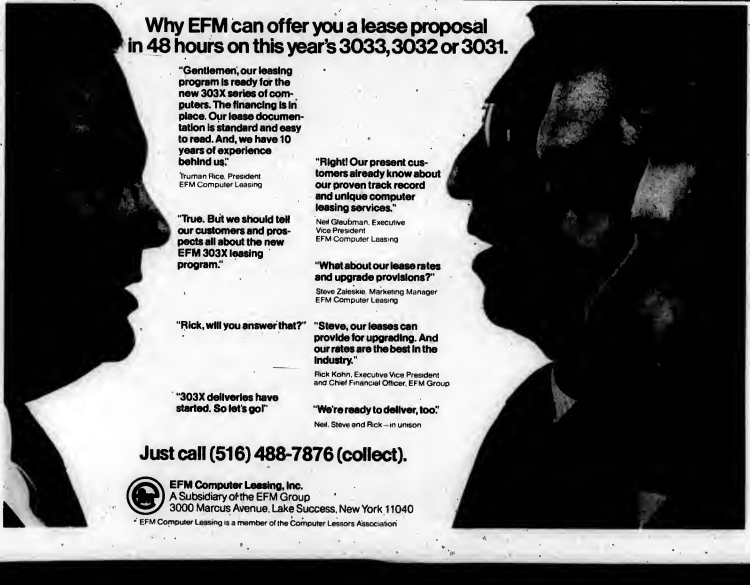
In addition to centralizing their internal computing functions, the developing nations will be talking to each other, sharing common problems and solutions, Karoui told the symposium attendees. They will exchange applications and techniques for dealing with the computer suppliers.

Both the U.S. and the United Nations can contribute substantially to the development of computing and communications in developing nations by providing money and expertise, Karoui stated.

The UN's 1979 conference on science and technology may well be a forum for the developing nations on their computer and communications needs, a U.S. observer suggested.

Dr. H.R.J. Grosch, president of the Association for Computing Machinery (ACM), was moved by Karoui's remarks, in particular, to tell the developing nations that the exploitation they are facing now from the manufacturers occurred in the U.S. in the 1950s and early 1960s. "Believe me, we have suffered in the same way ourselves," Grosch said. "We were at the mercy of the manufacturers — IBM

(Continued on Page 18)



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Calendar

May 15-17, Chicago — **Computer-Communication Network Design and Analysis**, sponsored by Columbia University School of Engineering and Applied Science. Contact: Columbia University, Conference Center, 360 Lexington Ave., New York, N.Y. 10017.

May 15-17, Atlanta — **Commercial Applications of Minicomputers**, sponsored by American Management Associations (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

May 15-19, Atlanta — **16th Annual Association for Educational Data Systems (Aeds) Convention.** Contact: Convention Registrar, Aeds Headquarters, 1201 16th St., N.W., Washington, D.C. 20036.

May 15-19, Atlanta — **Computer Technology: The Educational Catalyst**, sponsored by the Association for Educational Data Systems (Aeds). Contact: Dr. James E. Eisele, Program Chairman, Aeds Presessions, Office of Computing Activities, University of Georgia, Athens, Ga. 30602.

May 16-19, Los Angeles — **Fiber Optic Communications Systems**, sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held May 30-June 2 in Toronto.

May 17, Hartford, Conn. — **Greater Hartford Chapter of the EDP Auditor's Association Meeting.** Contact: Allan Nierenberg, Price Waterhouse & Co., 1 Financial Plaza, Hartford, Conn. 06103.

May 17, New York — **IV Phase Users Group Meeting.** Contact: Peter C. Daikos, Vice-President, IV Phase Users Group, P.O. Box 902, New York, N.Y. 10008.

May 17-19, San Francisco — **Structured Design and Programming**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

May 17-19, Dallas — **Government Project Management**, sponsored by New York University, School of Continuing Education. Contact: New York University, 360 Lexington Ave., New York, N.Y. 10017.

May 20, Los Angeles — **11th Annual Spring Systems Seminar on Man-Machine Relationships**, sponsored by the Association for Systems Management and the Association for Computing Machinery. Contact: Richard Cantor, 10609 Willowbrae Ave., Chatsworth, Calif. 91311.

May 21-24, Houston — **Management of Information Systems**, sponsored by the American Society for Information Science (Asis). Contact: Asis, 1155 Sixteenth St. N.W., Washington, D.C. 20036.

May 21-24, Chicago — **Conference on Combating Computer Crime**, sponsored by the International Security Conference (ISC). Contact: ISC, 2639 S. La Cienega Blvd., Los Angeles, Calif. 90034.

May 22-4, Cherry Hill, N.J. — **Data Entry Management and Supervision Seminar**, sponsored by Management Information Corp. (MIC). Contact: MIC, 140 Barclay Center, Cherry Hill, N.J. 08034.

May 24-27, Thunder Bay, Ont. — **Medical Group Management Association of Canada Convention.** Contact: R.R. Babcock, Port Arthur Clinic, 194 Court St. North, Thunder Bay, Ont. P7C 1T5, Canada.

The CW Calendar generally appears in the first and second issues of each month, and events are listed a month in advance. All conference announcements should be sent to Calendar, CW Editorial Department, 797 Washington St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

Third World Acquiring DP

(Continued from Page 17)

and Univac — at first. That is part of the growing pains of learning about computers," he added.

Richard Tanaka, past president of the International Federation of Information Processing Societies (Ifip), told representatives of the developing nations that by working through the United Nations Educational, Scientific and Cultural Organizations (Unesco), Ifip hopes to institute a plan for traveling seminars on informatics. Such a seminar was held in India a few weeks ago to train the local people to meet their computing needs.

"The goodwill of the technical people in the industry hasn't been tapped enough," Tanaka said.

Grosch suggested that organizations like Ifip, Unesco and IBI might band together to form a corporation like the Rand Corp. The corporation would seek to be manufacturer-independent, he said.

Investments

Karoui of Tunisia suggested that another way to get the manufacturers to be responsive to the needs of developing nations is to force them to invest in these countries if they want to do business with them.

"The developing countries are looking to the U.S. manufacturers, and not to the U.S. government, for help in this area. Why isn't a country like the U.S. interfacing with these nations as a government?" Bernasconi asked. "Japan is. That's the message I want to leave you with."

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Coordinating Organization Proposed

User-Researcher Communications Gap Decried

By Marguerite Zientara
CW Staff

TORONTO — There is a serious need in the computer community for an organization that includes high-caliber commercial professionals as well as scientific researchers to bridge the communications gap between the two, according to Nathan Fichman, systems/support analyst at Perkin-Elmer Data Systems of Canada, Ltd.

Fichman presented his theory in a session entitled "Closing the Gap Between the Scientific and Commercial User Communities" at the recent Data 78 conference here.

Universities presently engage in much misdirected research that is useless to the commercial user in the planning, design and implementation of distributed processing systems, Fichman said.

Publication-Oriented

The on-line/real-time researcher typically works in a vacuum detached from reality, Fichman said, and in addition is publication-oriented rather than result-oriented. Within the constraints of limited resources, he is forced to make oversimplified assumptions that enable him to solve his model, but render it useless to user communities, Fichman asserted.

The on-line/real-time user faces the problem of minimizing the investment, the operating expenses and the risk, thereby maximizing the benefits of his system. However, this user cannot recognize the relevant data he should collect in order to use the right variables in evaluating the projected cost and performance of a system, Fichman said.

Furthermore, most of the data he needs is in unusable form and not centralized, he added.

Benefits to User

The creation of a nucleus of commercial and academic professionals would enable researchers to overcome their resource limitations and validation problems and would provide relevant informational tools to the user community, resulting in reduced risk and reduced cost, in setting up their systems, Fichman said.

Fichman presented a simplified model for the planning, design and implementation of a system.

First the user should determine the current status of the system in terms of capital and operating costs, performance, equipment utilization, storage volumes and processing workloads.

Next he should define future plans as characterized by required performance levels storage volumes and processing workloads, typically over a three- to five-year range; and plans for new application systems, Fichman said.

Then he should get input from vendors indicating the cost and performance of new products and their compatibility with equipment currently used by the organization as well as information on conversion costs and time frames.

Another step is to define the requirements and objectives after analyzing the current status and future plans.

Design Alternatives

Then the user can design alternative solutions based on skill and known properties of various similar designs. Next, a comparative analysis of alternatives can be made through a high-level simplification that enables the analyst to control the complexity of the systems under investigation.

After this the plan should go to top management, who will consider corporate policies and control in making a decision.

Finally, Fichman said, implementation involves such aspects as project planning, system development, testing and conversion.

The use of these steps as a reference framework for research will help focus research on relevant issues and needs will enable both communities to cooperate and communicate with a sense of common purpose, will decrease the risk and cost of implementing and operating on-line/real-time systems and will provide researchers with a sense of achievement from having produced something useful, Fichman said.

Cedpa Picked As DPMA Unit

PARK RIDGE, Ill. — The executive council of the Data Processing Management Association (DPMA) has recognized the California Educational Data Processing Management Association (Cedpa) as a provisional special interest group in education within DPMA.

Cedpa, composed of 200 members from educational and governmental institutions, was founded 15 years ago.

Under DPMA rules, a provisional special interest group can be organized when the DPMA executive council is petitioned by a group of at least 50 people, none of whom need to be DPMA members except the president or chairman of the group.

The current Cedpa president is Sam Price, DP manager at the University of California School of Medicine at Davis, Calif.

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Directory of Executives Out

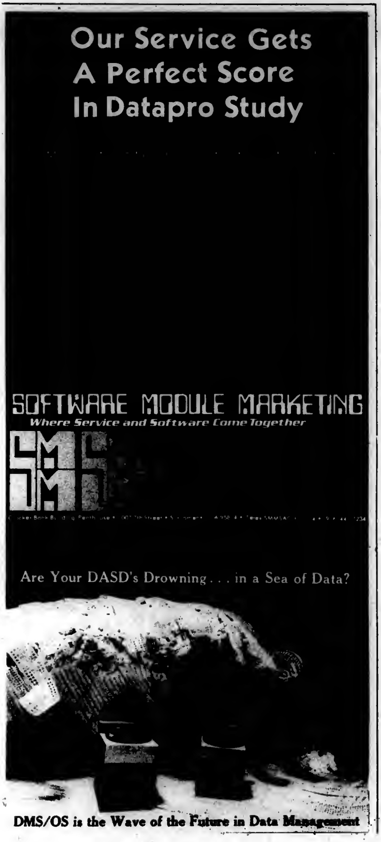
PHOENIX – Applied Computer Research's semiannual "Directory of Top Computer Executives," now available, includes 1,100 new listings.

Entries in the main section of the publication are listed in geographic order, by city within state, as opposed to the previous organization by industry classification. There is, however, a cross-reference for 12 different industry and government classifications.

The latest edition contains the largest increase in listed installations for any single issue since the directory was started over five years ago, according to the company. Most of the increase was attributed to the addition of government health services and federal, state and local government users.

The data base used in compiling the directory has been computerized and may be purchased or rented on tape for special applications.

The directory costs $75 for single copies with additional copies for $45, from P.O. Box 9280, Phoenix, Ariz. 85068.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Programmed Nutrition Data Peps Up Student Athletes

By Ann Dooley
CW Staff

SYRACUSE, N.Y. – Football and basketball players at Syracuse University here get pep talks from an automated "coach" about their diets and what they can do to improve their performance in the nutrition game.

The idea of analyzing food intake by computer was started by Prof. Sarah Short, who has used computer-assisted instruction with her nutrition students for the last 10 years.

At the coaches' request, Short began to analyze players' diets in addition to her regular work with her nutrition classes, he said.

Food Code

Students and players indicate the kinds of food and amounts they have eaten in a typical day and Short breaks that information down into portions and translates that into grams.

Each food is given a code number, according to Short, who enters the food number and the number of daily grams consumed into the university's IBM 370/155 via a CRT terminal. The computer is programmed with more than 3,000 nutrients found in common foods and, when accessed, provides information on the exact amount of nutrients in a person's diet and compares it with the recommended amounts, Short said.

The computer is also given information about each person's daily activity and can indicate the difference between the calories used in exercise and the calories ingested, Short explained.

The system also breaks down the athlete's daily intake into food groups such as fats, carbohydrates and proteins and indicates their relationship to each other because the amount of food eaten is often not as important as the combination in which it is eaten, Short noted. The nutrition percentages are based on recommended daily allowances from the National Research Council, she added.

The students – especially the players who have to spend large amounts of money to feed themselves – are delighted with the system, Short noted.

Recommended Calories

The recommended number of calories to be consumed by an adult male is 2,000, but Short found one wrestler consuming as much as 14,000 calories. "The football players seem to eat more than the basketballers and the wrestlers go from eating very little to a large amount," she said.

What Short found especially interesting, she said, was that the sports players' diets didn't vary much from those of the students in her nutrition classes, even though the players were able to burn up more of their food intake in exercise.

Short, who started the program herself, said much of the first programming was done with "horrible mistakes," but she has since handed the task of programming to her son, William, a doctoral candidate at MIT.

The system is not programmed to tell students how to improve their diets since that is what her students are expected to learn from her course, Short said.

Short's students use the program to devise a well balanced menu for a family with different tastes and nutritional requirements. "But we've found that regardless of how exotic a family's tastes and habits may be, the computer can accommodate any special diet so long as we give it the proper information," she noted.

Students could even plan ethnic menus such as Middle Eastern, Chinese or Italian, Short said.

Continual updating occurs on the system as nutritional standards change and nutrition discoveries are made, she added.

Nominations Now Welcome For Inventors Hall of Fame

WASHINGTON, D.C. – The Department of Commerce Patent and Trademark Office has announced the call for nominations to the National Inventors Hall of Fame for 1979.

According to selection committee chairman Ralph King, each nomination should include the full name of the living or deceased inventor, identification of the specific major invention or inventions for which the nominee is known and the U.S. patent numbers for each invention. Any other pertinent facts deemed relevant to the nomination should be included.

Inventors are selected on the basis of patented inventions that have benefited the people of the U.S., according to King, who noted the selection committee will be comprised of representatives of 33 technical societies.

The National Inventors Hall of Fame was founded in 1973 by the National Council of Patent Law Associations; Thomas A. Edison was the first inductee to be honored. Other inductees have included Lee DeForest for a vacuum tube and Vladimir K. Zworykin for a CRT, both in 1977, in 1978 and Luis Walter Alvarez for basic radar systems.

Nomination forms can be obtained by writing to the National Inventors Hall of Fame, c/o J. Ralph King at Lowe, King, Price & Markva, Suite 210, Building 1, 2001 Jefferson Davis Highway, Arlington, Va. 22202.

The deadline for submission is Aug. 1.

'We Are Gathered Tonight to Pay Tribute to Those Whose Hard Work Laid the Foundations of Modern Technology . . .'

With Hands-On Experience

DP Course Produces Employable Ex-Prisoners

By John C. Scott
Special to CW

LEAVENWORTH, Kan. — A programmer training course that incorporates multilanguage learning, hands-on hardware training and production shop experience would be a good course anywhere. At the U.S. Penitentiary here, however, such a course is as valuable for a prisoner's rehabilitation as it is for his education.

The success of the course is measured not only by the number of graduates placed in the DP industry, but also by the recidivism rate (the number of released prisoners who have returned to prison). As rehabilitation, the course works; judging by the number of employed graduates, it works well.

Computer training at the penitentiary is a two-year vocational training course split equally between one year of classroom instruction and one year in an actual production environment. Students are admitted into the class on the basis of length of sentence, score on a programmer's aptitude test and an in-person interview with staff members.

If accepted, the student begins an intensive one-year classroom curriculum. Classes are in session eight hours a day, five days a week.

A strong foundation is built with a basic introduction to DP. Once a student has learned the fundamentals and gained experience in flowcharting, he begins to code in basic Fortran. He must write a minimum of 10 programs in Fortran; each designed to teach a concept and to be slightly more complex and difficult.

CPU Available

There is an NCR Century 201 at the institution so students can expect at least one turnaround per day, and they have ample time for both writing additional programs and debugging old ones.

Once the initial exposure to the system has occurred, and the student has completed the first set of Fortran programs, he graduates into NCR's assembler language, Neat/3. The same process takes him through Cobol Levels I, II and III, JCL and RPG.

Because the in-house system also acts as a terminal for the IBM 360 at the Department of Agriculture, advanced students must learn IBM languages in addition to the NCR ones.

At intervals, two students at a time are assigned to work with the operator in the computer room. The assignment is for a full week, and the experience is quite comprehensive. The school shares time with a private industry so the student gets a realistic view of what a commercial site would be like.

On-the-Job' Experience

One year after entering the course and at least 50 programs later, the student "half-graduates." He is again evaluated by both educational supervisors and production staff and is either terminated or "hired" as a result of the interview.

If hired, the student is assigned to a team within Computer Industries, a branch of Federal Prison Industries, Inc. A staff team leader integrates him into a team and assigns work for an outside contractor, usually the Department of Agriculture. The team leader is also responsible for teaching the student how to use the manuals and video equipment available.

Students have freedom in composing their own problems and have written both serious programs for model simulation as well as not-so-serious programs for crossword puzzle composition. Because of the security requirements of the institution and the sensitivity of the department to outside publicity, all programs must be approved by the respective team leaders before going into the computer.

Employable Graduates

The graduates of the program have proven to be highly employable. In companies where the training is unknown, there is a bit of initial skepticism at the level of education given.

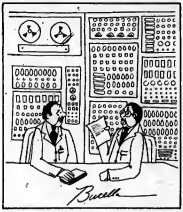
Once this reluctance has been overcome, however, the same employer will often ask for more men.

NCR, the company most familiar with the program, actively recruits at the institution and has hired quite a few men.

Academia has recently recognized the program to the extent that a local college gives 30 semester hours of credit toward its two-year degree in DP to all who complete the course.

Scott is serving a sentence for aiding and abetting a bank robbery and will be reviewed for parole in June. His long-range objective is to combine his background in programming, Arabic and the Middle East and work in computer sales.

Any interested party is welcome to write for more information on the program to: Beeler Gausz, Chief, Computer Industries, Federal Prison Industries, U.S.P., Leavenworth, Kan. 66048.



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Editorial

Refreshing Approach

The service firms are moving with a bang into the minicomputer arena, but they are taking a refreshing approach to the subject.

Automatic Data Processing, Inc. beat its service competitors to the punch with its introduction of the Onsite systems [CW, March 27] but was quickly followed by Keydata Corp. [CW, April 10] and now by National CSS, Inc. (Page 1).

All three of the service firms are now essentially offering mini systems, and although each has a slightly different wrinkle in its offering (see story on Page 79), they share one characteristic. They are essentially the first firms — except for possibly Amdahl Corp. and the other plug-compatible CPU makers — to approach system design from the software rather than the hardware point of view.

The firms are well established in the service arena, where they have been marketing for over a decade. This area is marked by its attention to software, rather than to hardware, since users of a service are more interested in what it can accomplish than in how it gets the job done.

So none of these vendors chose to talk much about the hardware in their new offerings, but all stressed the systems' software and services. This is a refreshing change from the typical computer manufacturer, which generally likes to extol the virtues of its new hardware and relegate software considerations to second place.

Perhaps the challenge from the services side of the business will force the systems manufacturers — particularly in the mini area, where the absence of good software is obvious — to take a harder look at their approach.

For too long, many of these firms have been able to offer users excellent hardware and stick them with the problems of inadequate operating systems, a lack of higher level languages and data base management systems and a dearth of applications software.

But now users have an option, and by exercising that option they may force others in the industry to also begin meeting the real user needs in the software area.

Only Time Will Tell

The importance of computer systems to modern society was clearly illustrated by recent stories on advanced cancer research and on tax collection [CW, April 10].

It was clear in the first case that the power of the computer to simulate chemical reactions had significantly shortened the process of finding drugs that may be effective in the battle against cancer. Without computers, the search for promising new drugs might take much longer — literally years or decades longer.

The other application may not be greeted with as much enthusiasm by most of us who have just finished filling out our tax returns, but it would be almost impossible for the income tax system in this country to work without the benefit of computers to process the claims.

So in less than 30 years, the state of computer use has progressed immensely from its first stirrings. With the research and development of new applications under way, one cannot but wonder at the changes that this technology promises in the next thirty years.

Data Past

Five Years Ago
April 18, 1973

WASHINGTON, D.C. — Computer verification of tax returns for fiscal year 1972 found that taxpayers made fewer errors than in previous years, according to the Internal Revenue Service (IRS). During that year, there were errors in 3.8 million returns, or an error rate of one in every 20 filed compared with one out of every 16 in 1971 and one out of every 12 in 1970, the IRS said.

— — —

WASHINGTON, D.C. — The Stanford Research Institute received a $21,000 grant to study how computers are — or could be — put to socially wrongful use. Under the direction of Donn B. Parker, the five-month study was to consider who the perpetrators of such crimes were, their motives, opportunities and methods; the attitudes of prosecutors and investigators; and whether 1973 laws were adequate for dealing with such abuse.

Eight Years Ago
April 22, 1970

WHITE PLAINS, N.Y. — IBM introduced a special-order device called the Multiple Terminal Communication Adaptor (MTCA) to enable users of IBM 2741 communications terminals or Teletype Corp.'s models 33 and 35 to link to a single 1130 system over as many as 16 half-duplex remote and local communications lines.

— — —

KANSAS CITY, Mo. — Businessman Bill Barber sued for $170,000 in damages after he was arrested for possession of a stolen credit card while at a meeting in a St. Louis motel. The card was on the computerized "hot list" used by the motel to spot such occurrences and it took nearly an hour before Barber, the authorities and the bank discovered his detention was a mistake. The cause of the embarrassment and inconvenience was found to be a simple keypunch error.

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Letters to the Editor

Tsunami Clarification

In Chapter II, Part 2 of Tsunami [CW, March 27], Charles Lecht stated: "Performance of the Model M-180L (known in the U.S. as the Itel AS/6) is claimed to be about 1.2 times that of IBM's 3033." This should have read "IBM's 3032." With so many different CPU model designations from so many plug-compatible vendors, this error could be misleading to your readers.

Additionally, the M-180L is not the same machine delivered to and marketed by Ital as the AS/6. Current performance ratings of the AS/6 should be nearer 1.1 times the IBM 370/168 (the 3032 was not the comparand in Itel's initial introduction and 3032 performance was an unknown). Prices quoted by Itel Corp. are more on a par with the 3032 since IBM's last price reductions on memory, depending on configuration options, not .75 IBM's price.

Marvin L. Silverman
New York, N.Y.

According to Charles Lecht, "Silverman's observations are correct. However, the differences between the Fujitsu M-180L and the Itel AS/6 are more subtle than dramatic." Ed.

Codasyl DBMS From IBM?

With regard to John Cullinane's commentary "Vendor Expects Codasyl DBMS From IBM" [CW, April 3], could it be that IBM's System R, being developed in San Jose, Calif., is the data base management system that will be announced shortly?

Howard Rutiazer
Laka Bluff, Ill.

Seeing the Light

The Learner's Lexicon in the April 3 issue gave a definition of "pen light" as "a pen-like device with a light on the tip used with a CRT." This, unless I am badly mistaken, was an attempt to describe a light pen.

Many beginners in the field have the misconception that a light pen emits light. This is not the case. A light pen senses light coming from the CRT through a light-sensitive transistor or similar device. There is no reason I could imagine to attach a pen light to a CRT since a CRT is not light-sensitive.

J.T. Rowan
Opelika, Ala.

Behind the Times

The DP community is 25 years out of date. Most of its members use the Able, Baker, Charlie, Dog phonetic alphabet when quoting character strings. The aviation world realized the deficiencies of this alphabet in the early 1950s and adopted a revised version (Alfa, Bravo, Charlie, Delta, etc.).

Let's stop sounding like old war movies, use an up-to-date phonetic alphabet and let sleeping Dogs lie.

Alan Rocker
Toronto, Ontario

Amused by Lexicon Error

Just thought I'd write to tell you that the Learner's Lexicon in the March 20 issue went particularly appreciated.

While CW readers can usually find room for a chuckle or two among the Lexicon's various vague, misleading and occasionally outright false definitions, I'm sure the definition of OCR as "operating character recognition" [instead of "optical character recognition"] brought forth peals of laughter all over the country.

Timothy Stryker
Providence, R.I.

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'Avenues to the Top'

Reader Details Career Plan for MIS Director

By Jack Stone
Special to CW

A feeling of despair seems to be clouding career development plans of senior DP management personnel. These people, often identified with the title "director, management information systems (MIS)," are becoming increasingly frustrated at being passed over for openings in the top-level executive ranks. It is particularly grating to many DP managers who feel they have saved the company or government unit from disaster by their strong dedication and production.

Obviously, those responsible for selecting people for these top-level positions have strong opinions as to the experience requirements. It nets down to a broad range of experience throughout the organization so that these executives can communicate and understand organizational matters at a higher level.

Here is a thought-provoking letter from a reader who suggests a strategy for dispelling the gloomy career outlook for the MIS executive. Although the writer has a corporate point of view, much of what he says applies to government units as well.

Dear Jack:

I have read and enjoyed "The Human Connection" and its "gut-level" discussions on the people-related issues in the DP community.

The specific subject I want to address is "dead-end DP career."

I suggest that it's time for top MIS executives to stop complaining about not being appreciated by top management and to start identifying with the business opportunities, challenges and problems facing their companies. There are "avenues to the top" for experienced MIS executives. Let's look at the positive attributes of successful MIS executives and then match their skills with those required by high-level positions.

First, there's broad company knowledge. Most experienced MIS executives understand the totality of their company far better than every other top executive, except the chief operating officer or possibly the senior financial officer. Most line executives do not have a chance to get as involved with the workings of the total company as do MIS executives.

Expanding our responsibility to include business planning (corporate planning, long-range planning, etc.) is the avenue to top management for MIS executives. Most professionals in the corporate planning field have no practical line management experience and little awareness of operating problems and their solutions. Although they have some knowledge of computers, it is quite limited.

Merging MIS and business planning in the organization makes obvious sense.

Expanding further the responsibilities of the MIS executive over the long range to include strategic planning, mergers, acquisitions and divestitures should qualify the person for a position on the board of directors. Many company presidents have moved up from being vice-president of corporate development, few from vice-president of MIS.

The Human Connection

Line Management

Second, there's line management experience. Manufacturing and sales executives are experienced in delivering a tough performance against ambitious operating goals, using tight budgets and managing large, sometimes geographically dispersed staffs. The results of their performance are measurable and, in most cases, obvious. The range of their performances can result in success or failure of a company's business.

MIS directors have similar responsibilities, since many manage computer operations spread geographically through on-line, remote batch and distributed processing applications vital to the continued operation of the business.

Third, successful MIS executives have business planning experience. Here lies perhaps, their strongest hidden talent. For how many years have we developed MIS plans without an adequate structure of top-level planning. We are forced by our hardware and software development lead times to plan; we have no choice.

Finally, there's experience in dealing with government controls and, in some cases, labor unions. In a number of companies, the largest group of nonexempt employees work for DP and they have, on occasion, been unionized. As for government controls, the MIS executive is as close as anyone to such issues as privacy and communications tariffs and regulations.

Why must the top MIS executives only have DP working for them? Why not include development, facilities, word processing, communications, corporate records management, reprographics and a host of other "step-child" functions?

The position of vice-president of corporate development and management services" is a realistic career goal for the MIS director.

Fred Held, Director
Management Information Services
Mattel Toys Division
Mattel, Inc.
Hawthorne, Calif.

Tax Question Vexing

Tangibility Question Seen in Different Light

The Taylor Report
By Alan Taylor CDP

The vexing question of whether programs are tangible or not has been on my mind these past few days because of a hearing in the Puritan Life Insurance Co. challenge to retroactive tax assessment in Rhode Island.

The result of the hearing won't be known for some time yet, as the two sides have to provide briefs and won't even start that until after the hearing record has been completed. However, the action seemed to shed some different light on just what a program is and how it functions.

Basically, a program is simply a number. For example, 46382970573 . . . 579 is a program.

It could be valuable if someone knew what it meant and how to use and maintain it.

Of course, programs in normal use are long numbers, much longer than any with which we normally come in contact. A court reporter would probably take some 25 pages to write down even the simplest worthwhile program segment. To write down the program part of an inventory control system, for example, would be as endless a job as painting the Golden Gate Bridge. By the time the reporter had written the program down, it would have been revised so many times with changes in operating system versions, patches, enhancements and parameters that the reporter might just as well start over.

But a program is still just a number. If you want to see one, take a core dump. That will give you the current number for a program in your particular situation. It's highly unlikely that it is the same number being used in someone else's computer for the same function — even if it was originally specified by the same designer. There are so many things that change the number to a greater or less extent without anyone ever realizing changes are taking place.

What's more, it isn't the same number that was read in at the time the program was first entered. Tape numbers are coded and safeguarded. Other numbers are inserted to see that no mistakes have been made. There are also preambles and postambles, parity numbers and cyclic checks. All of this is very confusing to people who think programs are physically moved by being picked off the tape and put somewhere in the machine.

Shadows and Shades

In fact, the way number information is passed into the machine is by a combination of shadows and shades, rustles of springs and varying electromagnetic vibrations in the air surrounding the reading heads. Cards simply provide either patterns of shade and light, or of brush springs rustling, that are then changed by the microprograms built into most systems to voltage control signals applied to pulses. This involves no eating of the holes on the card or anything physical like that. In fact, readers are not absolutely necessary; one could dial programs in. It would take some time, but some program parts are often dialed in, particularly when the program is being maintained.

This brings up another point. Although we talk about purchasing a program, just having the program itself (the pure number, 25 or so pages long) is no good unless you like having a time bomb in your installation.

The value of a program comes from having it supported and from the way it fits into a system with other supported programs. And support normally has to start long before the program arrives at the installation.

Support for a program often depends on a team working off-site, on the developer's premises, and that team has to be available much longer than we may often think. In fact, as far as I can see, for most programs, support must continue until the output is finally discarded.

My point is that if a program's output is ever held in some archive and it should ever be challenged, then the possibility that the output is the result of a programming error has to be faced. And it takes a support program to be ready to face that possibility, potentially long after the program has been run for the last time.

Nor does the value of support come from the frequency of use — not even from receiving those monthly updates. It is the fact that support is there, as backup, that counts.

All of which is very alien to the loose way we normally talk about programs, systems and tapes. But then we use a loose language, one which was first used for oral, rather than written, communication.

In such a language, matters can often be ambiguous and the real facts only discovered after conversationally checking meanings.

It is good to occasionally get back to basics and look at what is being used and how the physical merged with the intellectual to create the great computer revolution, which has already gotten so far from its roots that many of us never even see inside a card reader.

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Part-Time Education Fraught With Choices

By Martin Feuerman
Special to CW

The prospective student hoping to enhance his educational background in DP and computer science has many programs from which to choose and many decisions to make.

A degree-granting nonproprietary institution is preferable to a nondegree program, in my opinion, because many DP job opportunities require a degree.

Nondegree programs have certain advantages, however, in that they are often tailor-made for a student's vocational needs. One can register for courses geared to the particular hardware or software one might use.

Degree programs, on the other hand, often tend to stress theory and concepts and minimize discussion of the idiosyncrasies and technicalities of particular machines and languages.

Reader Commentary

In actual practice, it might be best for a student to look for educational programs that have a good balance between the two.

The Association for Computing Machinery in New York, the Mathematical Association of America in Washington, D.C., and other professional organizations periodically publish information on computer science programs which could serve as guides to programs available in a student's geographical area. These guides, among other things, indicate numbers and types of degrees awarded, number of full- and part-time students enrolled, number of full- and part-time faculty, number of courses offered and the computer facilities available.

Questions to Ask

The following are some questions to ask when investigating a particular computer science curriculum:

- Are the instructors full-time or part-time? There are advantages to both. The full-time instructor probably has more of a commitment to the school, the curriculum and teaching. On the other hand, a practitioner from government or industry who teaches part-time can relate his experiences (computer and otherwise) to the class and add much insight to any computer science program.
- Are the course offerings listed in the college catalog offered every semester? A disadvantage with some schools is that their offerings, especially in the evening, may be quite limited. Find out at the outset if it is possible to obtain a degree by attending only in the evening.
- Can one register officially for just one course and sit in on other classes during the first week of school? Not only does this avoid a late registration fee, but if any other courses appeal to the student, he can always add them to his schedule. By sitting in on as many courses as possible the first week, one can see firsthand what to expect.
- Are counseling services offered by the department? If so, determine at an early date from the counselors what the course requirements are if you are going for a degree, as well as any general course requirements in other fields that may be imposed by the college.
- Can one contact the instructor before the course starts to find out more about the course? The same course given by two different instructors could contain very different material, and neither one might follow the course descriptions in the bulletin.

At the very least, contact the bookstore and determine what texts are required for the course. This could give you some idea about the nature of the course. Finally, determine if there will be any "machine time" or laboratory sessions associated with the course — an obvious advantage.

- Have courses given in the past been evaluated by former students? The results of such evaluations might help one decide which course to take.
- Does the college have a placement service? It might be of some assistance to you in finding a (better) job. Find out if the office maintains dossiers and letters of recommendation for students. You can use this office to serve as a repository for your credentials and letters of recommendation. This material could then be sent to prospective employers or college admissions offices at your request.

Incidentally, when you complete one or more courses with an instructor and you believe the instructor knows you well enough, request that he mail a letter of reference for you to the placement office. Instructors can easily forget their students after a lapse of time, so seek references when you have just about completed the course.

- What is the college's policy on auditing courses? If you audit courses officially, you will probably be required to pay the same fee as if you took them for credit. However, some instructors might allow

(Continued on Page 28)

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Front-End Loading Sometimes Only Way

By Miles Benson
Special to CW

Sociology of Computing

Quick now — software is by nature costly and unreliable. What do you as a manager do to correct that?

Answer (at least, today's standard answer): front-end load. Focus more energy on requirements definition. Get the design stabilized before the start of coding. Flush out errors early in checkout using reliability tools. The cost picture is scarier, says this answer, but the end result is cheaper and better.

Who can argue with that?

Well, Char Jannell can. Char has managed a lot of software projects for Ring-a-Ding Tel and Tel, from teeny report generators to big data base management systems. And, to be truthful, she believes in front-end loading.

But she also knows it doesn't always work. This is the story of one of those times.

The Aerospace Biz

Ring-a-Ding sometimes dips its software finger into the exotic world of aerospace biz, and this was one of those times. It had contracted to build a real-time communications system for the new Air Force Voyeur surveillance aircraft, and Jan was selected as the manager in charge.

A word of explanation is in order here. When the Air Force defines the specifications for a job to be done, it does it right. It makes every effort to leave no contractual stone unturned. "When in doubt, specify it" may well be the Air Force watchword.

This does not mean, of course, that it makes no mistakes. The quality of the finished specifications is still directly proportional to the knowledge and skill of the assigned personnel, whether they wear a blue suit or dungarees. And the Air force has its share of bunglers.

Still and all, you can depend on at least an appropriate quantity, if not quality, of specifications if you do business with the Air Force. And Voyeur was no exception.

When the Voyeur specs were delivered to Char's office, the transportation man made three trips just to get all the boxes in. And when they were unpacked, they overflowed her bookcase and spilled onto the floor. Just getting on board Voyeur, Char saw, was going to be a significant task.

It turned out, on second look, not to be as bad as she had thought at first. The shelves of specs contained all information on all components of Voyeur. Software was just one of the components. It was just a matter of isolating those requirements. Easy, right?

Clancy Walker was a top-notch Ring-a-Ding requirements man, and Char chose him to do the job. He plunged into the effort with alacrity, scissors and tape and began extracting and posting requirements, separating them by functional category.

Since nothing else could happen until the requirements were all known, Char did not add any further staff.

Emotional Meeting

After a week of requirements prospecting, Clancy began wearing a furrowed brow. After two weeks of it, he looked definitely worried. Char called him in for a conference.

"They just keep coming," he blurted even before he had sat down in Char's guest chair. "The more requirements I pull out, the more turn up. They're interlinked and intertwined and incestuous. One seemingly innocent phrase obviously contains no requirement, so I ignore it, but then another phrase elaborates the first and suddenly they are both requirements."

"Look here," he fairly shouted, "the spec says, over here, 'The computer downlink shall be capable of multibus operation.' No apparent software requirement, right?

"But then over here it says, 'Bus servicing shall be under interrupt control' and suddenly software is getting into the act. This stuff is driving me crazy," and by now he *was* shouting.

Char decided to stay calm. After all, she thought to herself, requirements are never the death of a project. It may not have been an honest thought, she realized, but she needed it to stay calm.

Quietly and soothingly, in her best Transactional Analysis mode, she said "I see that you are very upset by this task, and I see that it is pretty complicated. Perhaps a new approach is in order, considering how tough this job is.

"Tell you what let's do. I've got a couple of spare recipe boxes at home. Why don't you bring in a flock of 3 by 5 cards, and we'll put each requirement on a recipe card and file them in a box.

"Each card can identify the source of the requirement in the spec and point to any implied requirements or related explanation. This way, we can get a handle on this problem."

It sounded simple enough, and

(Continued on Page 28)

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Front-End Loading Sometimes Needed

(Continued from Page 26)

Clancy bought it. Char was pleased to have solved another personnel crisis.

Building a Cookbook

It was when Clancy asked for a third recipe box, and funding for more 3 by 5 cards, that Char's turn came to be alarmed. "You mean the other two boxes are filled?" she gasped.

Clancy showed her. They were not only full, there were a couple of dozen cards that had no place to go.

"Those requirements just keep coming out of the woodword," he lamented. "The recipe box system is working, but there's no slackening in the pace of turning up requirements. I just made a second pass through the top-level system spec and turned up 32 more that I missed the first time." He seemed to be near tears.

So, for that matter was Char. While Clancy was trying to wrap his arms around the diffuse Voyeur software requirements, her overall schedule —was rapidly slipping away. If they didn't start soon, the software would be late. And Voyeur couldn't fly without it.

The software fat was in the fire, and hers along with it, Char knew. She had to break out of this bind. But how?

It takes a bit of gambler instinct to be a manager, sometimes. This was one of those sometimes for Char.

"All right, Clancy," she gulped, "I'm pulling you off the requirements job . . . " He looked startled. ". ... And putting you on the implementation team. Let's start building software" The pitch of her voice was just high enough to nullify the locker-room appeal she hoped the last sentence would convey.

"But how can we," said Clancy, "when we haven't identified all the requirements yet?" He said it with the conviction of a person who knows he's right.

"You're right, of course," Char consoled. "Except we have to, or we'll never finish on time. Here's how I see it, Clancy . . . only don't tell anyone later or I'll deny I said it. If you can't find all the requirements, then I'm willing to be sure the Air Force can't either. I don't care if they're all in the spec — if no one knows they're there, or what they imply, then they can't check for them.

"I want to gamble on that. I want you to satisfy the requirements you've found, and any others that come up at design review, and forget the rest."

Clancy nodded, a little stunned. "All right, boss," he said carefully, acknowledging that it was her neck and making it clear that it wasn't his.

And so they did. At the critical design review, the Air Force turned up a couple of new requirements Clancy hadn't found, but after that they were home free. Acceptance testing went off without a hitch, and so did delivery.

Which was just great, as far as Char was concerned. Except for two things.

First, it kept nagging away at her that there were a bunch of still unsatisfied requirements. What on earth were they, and what was the impact on Voyeur of not fulfilling them?

And then there was the second. How can you front-end load a project when the front end appears to be infinite?

The answer, Char had found, was that you simply couldn't.

Education Means Choices

(Continued from Page 24)

you to unofficially audit the course.

- Is financial aid available for part-time students? The financial aid office is there to serve you, so you might as well use it.
- If you have taken courses at other colleges, can you transfer credit to your new college? Also, can you get exempted from courses if you can prove you know the course material from previous training or job experience?

Points to Ponder

After making selection, but before actually enrolling in the course, there are some additional points to consider.

- Try to develop a well-balanced well-rounded program. For example, consider taking one or two courses in computer simulation techniques, even though your speciality may be data base management.
- Most instructors are either fairly receptive and/or are required to give conference hours. Make use of this opportunity, if necessary. Also, find out where the instructor can be reached by phone.
- Two regulations that part-timers should be aware of are residence requirements and time limitations for degrees. Some colleges may require you to be in residence (registered as a full-time student) for a minimum number of semesters.

Fortunately, the trend seems to be toward the elimination of this requirement. At many colleges, one can get associates, bachelors, masters, and doctoral degrees in computer science through part-time evening study.

Note however that there are usually time limitations on the completion of degree requirements.

Feuermon is in the Department of Information Processing at the College of Medicine and Dentistry of New Jersey in Nework.

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NO USER PARTITION REQUIREMENT
DOCS executes in its own pseudo-partition thus allowing the user unrestricted use of the problem program partitions.

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Business Gains Operating System in Basic

AURORA, Ohio — A Basic language operating system for business applications that features a continuous memory file system said to totally isolate the user from any sector, track or cylinder restrictions has been announced by Ohio Scientific.

The OS-65U operating system is specifically designed for business applications programmers and small business users and is based on Microsoft Corp.'s 6502 9.5-digit precision Basic. All operating system extensions are incorporated in Basic, allowing commands to be executed in immediate or stored program modes, a spokesman said.

The memory file system will support future bubble and charge-coupled device memories without user modification, the firm claimed.

The OS-65U supports one to four floppy disk drives, one to four 74M-byte hard disk drives, multiple terminals, multiple line printers and other I/O devices, such as modems and internal video display systems, the spokesman noted.

The OS-65U has the disk file syntax found in other extended Basics, including OPEN (file name), CLOSE (file name), PRINT (file) and INPUT (from file) statements. It accommodates sequential, random-access and index-sequential disk file structures, typically with three to seven Basic statements, the spokesman continued.

The operating system provides multiple-level password security that can completely lock out programs and data files from users or can give them limited privileges — for example, a "read-only" capability. The system also offers complete program lists and modification lockouts to prevent copying of applications programs; it also has an error detection facility, the firm noted.

The OS-65U runs on any Ohio Scientific floppy or hard-disk-based CPU with 32K words or more of random-access memory and costs $199 per CPU license from the firm at 1333 S. Chillicothe Road, Aurora, Ohio 44202.

Reach Broad Employee Spectrum

Bechtel's DP Courses Called Successful

By Don Leavitt
CW Staff

AUSTIN, Texas — DP-related training or education has taken many forms, with varied success, in companies across the country, but at San Francisco-based Bechtel Corp., courses are being well received by DPers and nontechnicians as well, according to Jerry August.

Speaking at the semiannual meeting earlier this month of users of MRI Systems Corp.'s System 200, the data base instructor told an overflow audience that about 25% of Bechtel's 9,000 employees in San Francisco have completed courses offered by the international engineering and construction management firm.

There are eight divisions within Bechtel and each has projects that are independent of one another. It is this environment of autonomy that is supported by the central DP operation, including education.

Bechtel offers two types of courses, August noted: General subjects, taught at a conceptual level, are considered to be mainly for the student's benefit, so they are offered on the student's time. The specialized courses — including technical training on System 2000 — are recognized as beneficial to Bechtel, so they are scheduled on company time.

The education group produces a course catalog once a quarter, outlining what training is to be offered in the next three months. The catalog includes course descriptions, schedule, a suggested progression — "We don't have many real 'prerequisites' " — and an enrollment form.

The training is primarily provided in lecture form, although the data base-specialized courses, the only ones August described in detail, also include "hands-on" experience through terminals linked to the company's Univac 1110 mainframe.

Two three-hour courses, one on data base management concepts and the other an introduction to System 2000, are in the general "curriculum" open to all Bechtel employees. They have, in fact, attracted a broad spectrum of students and that has created a real problem in trying to find appropriate teaching material, he said.

More specialized are offerings on System 2000's basic and natural languages, and on the report writer feature, August continued. These take eight hours each, split into four two-hour sessions scheduled on Tuesday and Thursday of two successive weeks. Students are expected to do "homework" on terminals between the classroom sessions, he said.

Upon completion of any course, a student is given a certificate signed by both the instructor and the employee's work supervisor. These make the students feel good, August said, noting he has seen many posted on the wall of the employee's office or work area.

Although the training procedure is well established now, the instructor said he has "some trouble" getting up to speed on technical aspects of System 2000 for the courses, largely because they are given so infrequently. Despite that, things are working

(Continued on Page 30)

Guide to Applications Design Aimed at On-Line CICS Users

NEW YORK — An applications design guide intended for on-line users of IBM's Customer Information Control System (CICS) has been introduced by Telecommunications Technology Corp. (Teltech).

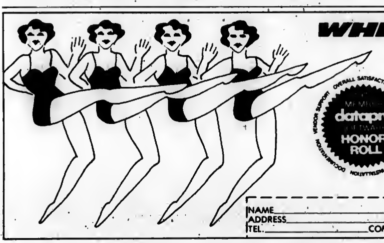
Teltech claimed this guide is the first comprehensive document to address all of the elements of a CICS Application System from project planning through project implementation, and said the guide should prove valuable to project management and highly technical personnel.

The guide is said to include detailed descriptions, analyses and commentaries on CICS project planning, project documents, controls, user relations, planning and selection of a file organization and DL/1 as a data base manager.

Other topics discussed include selection of a programming language, command-level programming, IBM 3270 design considerations, virtual storage considerations, recovery and restart planning and CICS programming standards.

Published in a loose-leaf binder, the guide is in updatable form and owners will be informed of subsequent page replacements, additions and expansions as they are released by Teltech, a spokesman said.

The *CICS Applications Design Guide* costs $45 per copy, plus $2 for postage and handling if a check is not sent with order. The firm is at Suite 303 East, 200 Park Ave., New York, N.Y. 10017.



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Operating System Features Language Independence

PLEASANTON, Calif. — Small CPU software can be enhanced by the interlanguage communication feature of an operating system introduced by Processor Technology Corp. (PT).

The firm's disk operating system (PTDOS) allows programs written in one language to communicate with data in another language, according to a PT spokesman, who said high-level languages that can take advantage of this feature include extended Basic, Fortran, Focal and Pilot.

For example, he noted, a program running in Fortran can access data created in Basic and then edit other data written in Focal.

PTDOS permits raw data created under its own text editor or assembler to be accessed by these high-level languages. This feature reportedly simplifies the programming of complex data manipulation applications, such as word processing.

PTDOS runs on PT Sol CPUs, including the Sol-20 terminal CPU with built-in keyboard and Helios II disk memory sytsem.

Costs of integrated systems including PTDOS and Helios II start at $5,995. The firm is at 7100 Johnson Industrial Drive, Pleasanton, Calif. 94566.

Counties Get Tax Package

DAYTON, Ohio — A package allowing county agencies to record and process property tax payments has been introduced by NCR Corp. for use with its I-8200 CPU family.

The Interactive Tax System is designed for counties with up to 40,000 separate tax parcels. Data is entered by operators, who are prompted by CRT-displayed instructions, and the data is immediately posted to all files concerned, an NCR spokesman explained.

The data can also be entered into the system from magnetic tape cassettes. NCR 250 electronic cash registers, located in the agency treasurer's office, record details of a tax payment on a cassette as the transaction is made; and, at day's end, the cassette is loaded onto an I-8200 CPU for the processing of its data, the source added.

The system is designed so that a number of departments — usually the tax assessor's office and the treasurer's office — can have access to the information through the CRTs.

Twenty separate but related programs comprise the package, allowing the storage and updating of information on property tax payments; assessment data collection; change-of-evaluation notice printing; cash receipt reportage; and the printing of tax statements and various reports.

An NCR I-8230 or I-8250 for use with the system requires a processor with 64K memory, 25-million-byte-capacity disk unit, CRT and line printer.

The Interactive Tax System costs $3,000 from NCR, Dayton, Ohio 45479.

Text Editor Runs on PDP-11

APPLETON, Wis. — The System for Interactive Text-editing, Analysis and Retrieval (Sitar) developed by Lawrence University includes 20 different program modules that function under Digital Equipment Corp.'s RSTS environment on PDP-11s.

Under Sitar, all files are conceived as single-character strings from which any substring, defined by an instruction statement, can be retrieved and displayed on a CRT for inspection or modification, a spokesman explained.

Sitar creates, copies and truncates files and works with either disk or magnetic tape media. It can format and print a file, keying on codes embedded in the text, for use in letter writing, maintenance of address files and documents subject to change, he added.

The system can accumulate a file of "hits" satisfying a search pattern and may use special characters signifying any character, letter or any punctuation, in order to generalize or particularize the search pattern and set boundaries on the search effort.

The spokesman added that Sitar's instructions are English command words "that mean exactly what they do." One of the things they do, he said, is to "keep a hole" for insertions at the point of editing a file, rather than creating a new file including the changes.

With development funded by grants from the National Endowment for the Humanities and the Andrew Mellon Foundation, Sitar runs in a 16K user space on any PDP-11 under RSTS. The package costs $500 for nonprofit organizations, $900 for others and is available from The London Stage Project, Lawrence University, Appleton, Wis. 54911.

Bechtel Courses a Success

(Continued from Page 29)

well, he said.

It wasn't always that way. The data base courses started in 1975 and were so general in scope that they were little more than "slide shows," with no "hands-on" exposure to the topics being presented. But the demand for quality — and quantity — increased as the data base administration group took shape and spread the word on the potential benefits of the data base approach.

Working with MRI, August developed manuals appropriate to the subjects he wanted to teach, he said.

Perhaps the most important lesson he has learned is that the subject matter must be paced slowly enough to be absorbed by the students. Enthusiastic discussions of the system's niceties before the basics are well established can destroy the course's effectiveness.

"You must gain control over yourself to be effective," he warned the users at the conclusion of his presentation.

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NATIONAL **–SPECIAL LEAR SIEGLER ISSUE–**

INFORMER

April 17, 1978

LEADING SCIENTIST CONFIRMS EXISTENCE OF INTELLIGENT LIFE AT LSI

Every 5½ Minutes The World Gets A Little Dumber

Page 9

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Project X Connected With UFOs?

Page 14

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Project X Rated Tops in Interest, Readers' Poll Shows

Page 11

★ ★ ★

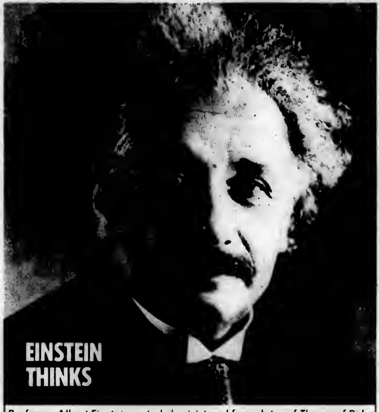
Link Found Between Dumb Terminal and Ballistic Printer

Page 20

★ ★ ★

Thousands Losing Sleep Over Project X

Page 8



Professor Albert Einstein, noted physicist and formulator of Theory of Relativity, had absolutely nothing to do with Project X. *PHOTO*

A top-ranked, noted scientist has confirmed rumors that Lear Siegler's secrecy-shrouded Project X is indeed hard at work on new, mind-boggling devices.

The famous scientist, who prefers to remain anonymous, asked that he be identified only as Dr. ________.

Concerning the mysterious Project X, Dr. ________ declared that LSI's primary intent was to use Project X as a vehicle through which to "totally dominate this year's National Computer Conference (NCC)." Dr. ________ told the INFORMER that, based on scientific deductions, and on several unsavory contacts the Doctor inexplicably retains, the evidence of Project X is irrefutable. At the very least, LSI is developing new, smart terminals, highly intelligent terminals, fantastic new printers, and even an incredible terminal controller. Dr. ________ told us he had suspicions that the terminal controller was in fact so intelligent and capable that it could, in certain instances, actually replace Homo Sapiens. We at the INFORMER feel his worries are exaggerated.

There remains little doubt, however, that Project X is indeed as large and all-encompassing as the INFORMER felt it was when we began this investigation. The ramifications of Project X are awesome and imply a total domination not only of the NCC, but of the entire computer industry — if not now, then surely in a few months' time.

It also seems clear that only a corporation with the stature, experience, and expertise of Lear Siegler, Inc. could hope to pull off an industry-shaking endeavor such as Project X. Already world-renowned for its unparallelled Dumb Terminal and Ballistic Printer, LSI prefers not to rest on its laurels. Instead, a top-priority, broad-spectrum undertaking like Project X is initiated and, according to Dr. ________ and other INFORMER sources, breathtakingly close to success.

What strange and wonderful revelations is Lear Siegler bringing to the world behind the bolted doors of Project X? Will we all have to wait until the NCC to find out how Lear Siegler plans to stun the computer industry? And is Dr. ________ correct in his logical, scientific deductions concerning Project X?

There is something even more mystifying about this silence on LSI's part. An informant working in Lear Siegler HQ, who shall remain nameless, told the INFORMER at presstime that LSI has had the audacity to actu-

(Please turn to page 3, column 2)

TI Adds Pascal to Mini's Repertoire

HOUSTON — A Pascal software package said to be suitable for systems applications because its compiler and several software modules are themselves written in Pascal has been introduced by Texas Instruments, Inc. for the firm's DS990 packaged disk-based minicomputer systems.

Applications traditionally written in Fortran or Algol are within Pascal's domain, a TI spokesman indicated, explaining that Pascal is a general-purpose block-structured language known for its ease and speed of use and for its maintainability.

The 990 Pascal executes in the multiuser environment of TI's DX10 disk-based operating systam, adding the benefits of more than 170 interactive user-oriented commands plus 240 utilities, he said. In addition, DX10 supports Cobol, RPG-II, Business Basic, Basic and Fortran IV, he noted.

Included in the 990 Pascal software object code license are a Pascal compiler and runtime library, a nester utility for standardized source indentation, a configuration processor to support separate compilations of nested program modules and a reverse assembler that outputs Pascal object modules in 990 Assembly language source format, according to TI.

The minimum hardware requirement for 990 Pascal is the TI DS990/4 system containing a TI 990/10 minicomputer with 128K-byte memory; a 10M-byte disk drive; a TI 911 CRT; a single-bay desk enclosure; and a DX10 software license.

In conjunction with announcing the Pascal availability, TI said that from March 6 through June 30, purchasers of DS990 packaged systems can select at no charge one programming language license from Cobol, RPG-II, Business Basic, Basic, Fortran IV or now, Pascal.

The 990 Pascal software object code license with its one-year software subscription service costs $1,500 to $2,000, depending on media desired, the firm said from P.O. Box 1444, Houston, Texas 77001.

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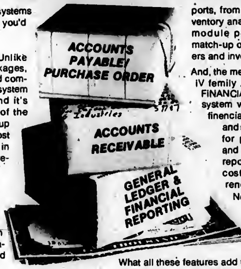
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Package Beefs Fortran Power For Megamini

OCEANPORT, N.J. — An enhanced Fortran hardware/software package has been introduced for its 8/32 Megamini CPUs by the Interdata Division of Perkin-Elmer Corp.

The Fortran Enhancement Package has Fortran runtime library (RTL) routines implemented in Interdata 2K writable control store, allowing execution that is two to three times faster than Interdata's Assembly-level implementation, a spokesman said.

The routines are completely transparent to the user programs and "generate the most accurate results in the minicomputer industry," he claimed.

The package is said to benefit users with real-time applications including statistical analysis, process control, simulation and graphics display. It offers exponentiation and trigonometric functions in single and double precision, Interdata said.

Overall performance improvement varies with the extent these routines are used, the spokesman noted. About 1.5K of the writable control store is employed to implement the Fortran runtime library routines, while the customer can use the remaining .5K to add his own functions, thus customizing the facility and presumably enhancing performance even more.

A software development package is included that features a microassembler for microprogram writing and a support progtam with debugging capabilities.

The Fortran Enhancement Package costs $6,300. Perkin-Elmer's Interdata Division is at 2 Crescent Place, Oceanport, N.J. 07757.

Micro DBMS Set as Workshop

PHILADELPHIA — A series of four one-day hands-on workshops for its Micro-Seed data base management system (DBMS) has been scheduled by International Data Base Systems, Inc. (IDBS). Designed to familiarize with DBMS techniques and Micro-seed, those devloping small business systems, the sessions are also directed at anyone desiring an introduction to Codasyl DBMS concepts, IDBS said.

Covered in each session will be an introduction to data base management, logical and physical data structure design, the Codasyl data Definition Language (DDL) and Codasyl Data Manipulation Language (DML).

At the end of the day, participants will have the opportunity to design and implement their own applications on the Micro-Seed DBMS, a spokesman said.

"A microcomputer is a terrific teaching tool because of the immediate reality that it imparts — there is no mysteriously distant computer," Dr. Rob Gerritsen, IDBS president, noted.

The workshops are scheduled for Fridays in Philadelphia on May 12, June 30, July 28 and Sept. 15, with additional dates and locations to follow, the spokesman said.

Tuition will be $195 with discounts for multiple registrants. IDBS is at 3700 Market St., Philadelphia, Pa. 19104.

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Misnomer for Other Software

'DBMS' Label Stuck on Too Many Packages?

By Stephen L. Robinson
Special to CW

Data Base Corner

In a recent reader commentary [CW, March 13], I responded to L.B. Towner's article on the future of data base management systems (DBMS). I have since received quite a number of calls and letters from people who misinterpreted my column.

I was not downgrading the present set of Codasyl recommendations (my commentary noted that non-Codasyl DBMS are borrowing some of the excellent features of Codasyl); I was *not* claiming that existing Codasyl implementations are inferior to non-Codasyl packages; and I was *not* saying that one should not consider or acquire Codasyl packages.

I did say that one should not rule out a data base package simply because it is not Codasyl; I said one should not select a data base package simply because it is Codasyl; I also said I do not believe the Codasyl standards, even if accepted tomorrow, would impact the enhancement of existing non-Codasyl systems, nor would they deter the development of new non-Codasyl systems.

Basically, the gist of the article was; "Don't buy a book by its cover" — or a data base package by whether it is Codasyl.

Now that I have hopefully clarified my views on Codasyl data base standards, I would like to pose a question for vendors, users, academics and philosophers: Just what is a DBMS anyway?

I recently came across an announcement for a "DBMS for S/360, 370" that said, "The input/output system (IOSYS) is a comprehensive data base management system for all IBM 360/370 environments."

The announcement pointed out that IOSYS can be used as a replacement for Isam, Vsam, sequential and other access methods.

That's nice, but which is it — a DBMS or an access method? Indeed, what is the difference between a DBMS and an access method? A DBMS and a communications package? A DBMS and a report writer? A query facility? A file handler?

I have sent for the literature on IOSYS, so I will be in a position to judge for myself whether I consider it to be a DBMS or an access method. However, I am clearly not the DP industry. It would probably be helpful to everyone if a standard set of definitions existed to categorize such software.

Most industries have such standard categories. A person who wants to acquire a piano does not have to peruse literature on organs, harps and bagpipes, because they do not advertise themselves as being pianos.

A person looking for a DBMS, however, is likely to end up investigating bare-bones access methods, report writers, edge-notched card systems and query languages, to name but a few. Not that there is anything wrong with such systems, but why must they call themselves DBMS?

To answer my own question, because that's the latest buzzword, and buzzword items sell. I for one am distressed. It's not that we don't have truth in advertising in DP, but that we can't agree on what the truth is.

Case of Data Boss/2

If you're still not convinced there is a problem, I refer you to an item in the March 20 *Computerworld*. Data Boss/2, a DBMS (there's that acronym again), was described by its vendor, Florida Computer, Inc. as meeting " 'two-thirds' of the specifications of a Codasyl-style DBMS."

However, according to the article, Data Boss/2 does not support Cobol programs. Indeed, it apparently supports only Basic and Basic Plus.

I don't know about the Data Boss people, but I consider the Data Defintion Language and Data Manipulation Language to be equal components of the Codasyl specifications.

Data Boss also apparently does not support CALC and VIA modes of data storage, SET logic for interfile record relationships and subschemas. How then can Data Boss/2, missing well over half of the Codasyl specifications, be two-thirds of a Codasyl-style DBMS?

Let us ask another question. Why does the vendor go to the trouble to cloud the advertising of what is apparently a useful package by claiming it is Codasyl? Answer again: It probably helps sell the product.

I would welcome views from readers on what they consider a package needs to be a DBMS, data managment system (DMS), a report writer, a query facility, an access method, a file management system (FMS) and any other package classification that has to do with the storage, maintenance and display of data.

In addition, if you spot any examples of glaringly deceptive advertising in such products, please forward them to me at S.L. Robinson & Associates, 517 N. Pennsylvania Ave., Morrisville, Pa. 19067.

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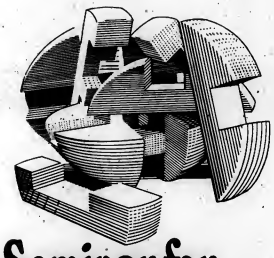
Puzzled by Database?



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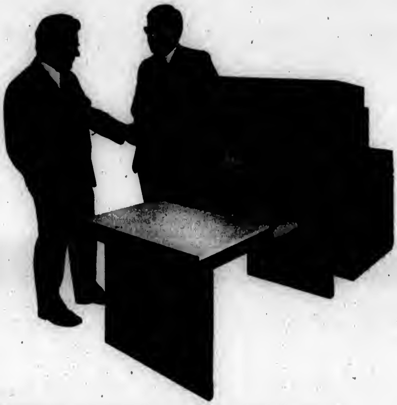

"NCR eased us through a period of exploding volume," says Joe Vitolo of fast-growing Bank Leumi Trust.

NCR's HANSON: Joe, how can you grow through four NCR computers in just three years?

VITOLO: Well, it's a great story, Tom. The answer is rapidly increasing volume. During those three years, Bank Leumi Trust enjoyed extraordinary growth. We went from just 6,000 to almost 100,000 accounts–from $250 million to $1.28 billion in assets.

HANSON: Did changing computers hurt your operations in any way?

VITOLO: Absolutely not. In fact, our operations actually increased in sophistication. During that same time frame, we became the first major New York commercial bank to go into full on-line operation.

On the left is Joseph D. Vitolo, Executive Vice President, **Bank Leumi Trust Company,** New York, N.Y.; on the right, Thomas Hanson, NCR District Manager and Financial Systems Specialist.

HANSON: If I need an example of NCR's Migration Path Engineering, Bank Leumi may just be the best there is.

VITOLO: You're talking about the relatively easy transition from system to system?

HANSON: Yes. NCR builds more continuity into its systems than any other full-line mainframe supplier. We ease those painful conversions from our entry-level systems step-by-step all the way up to the biggest 8000 series systems, the Criterions. That's "Migration Path Engineering".

VITOLO: That's what helped make our speedy growth possible. We've gone from the NCR Century 101 to the Century 251 to the Century 300 to our present NCR Criterion–the 8570. Each time, we seemed to have capacity to burn. But our growth continued to surprise us.

HANSON: And what happened to your software as you changed systems?

VITOLO: Our basic software system didn't change. It just ran faster. We didn't have to rewrite it for the new system.

HANSON: But you did rewrite, eventually.

VITOLO: That's precisely the point, Tom, as you well know. We rewrote only when the application software was at the end of its normal life cycle – when we would have rewritten even if the hardware had not changed. The software was not obsoleted by the change in systems. And when we rewrote, we used the enhanced command structure of the larger system.

HANSON: And how does that experience compare with the jump from Century to Criterion, from generation to generation?

VITOLO: Exactly the same. The Criterion 8570 is a virtual machine, which means that it can function as a Century–it runs our old programs somewhat faster, and without modification. But when we rewrite our software, we will do it in NCR COBOL 74 to gain top efficiency in programming and operations both. Because the Criterion can operate as a COBOL 74 virtual machine, too.

HANSON: And you are still protected in case you continue to grow. There are two larger Criterions available.

VITOLO: And an even bigger family waiting in the wings, I understand.

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Package Supports Fortran

Subroutines Back PDP-11 in Lab

MAYNARD, Mass. — A packaged set of Fortran-callable subroutines said to perform a variety of common analytical laboratory tasks has been introduced by the Digital Equipment Corp.'s Laboratory Data Products Group.

Called LSP-11, the package can be run with Fortran on all current PDP-11 CPUs — the PDP-11/03 through the high-end PDP-11/70 minicomputer. All subroutines are involved with processing data acquired by other laboratory system software.

The LSP-11 package is comprised of subroutines for peak processing, interval histogramming (with or without reference points), Fast Fourier transform, phase angle and amplitude spectra, power spectrum and correlation functions, a source said.

The LSP-11 works with the RT-11 operating system, supporting Fortran IV/RT-11 and with RSX-11M supporting either Fortran IV/IAS-RSX or Fortran IV-Plus, he added.

"Many laboratory researchers have been forced to do time-consuming programming . . . developing data reduction routines from scratch. Often, they would prefer to concentrate on their applications instead of having to develop analytical programs."

"LSP-11 frees them from time-consuming program development by providing powerful tools that can be easily integrated into their application programs," he continued. "The ability to use the same source language programs with the full spectrum of PDP-11 computer systems makes possible the development of system-independent application programs."

LSP-11 is licensed at $300. DEC is in Maynard, Mass. 01754.

Free Guide Helps Users Size Up Data Dictionaries

CINCINNATI — A "Data Dictionary/Directory Evaluation Criteria" guide is being offered here for free.

The guide is based on research and experience of information systems development groups, the firm said, noting the publication stresses both the logical business aspects of information systems development and programming considerations.

The guide also provides tips for the evaluation of Pride-Logik, the firm's information systems and data resource dictionary/directory.

Copies of the guide are available from M. Bryce & Associates at 1248 Springfield Pike, Cincinnati, Ohio 45215.

Cibar Schedules Five Courses On Structuring

COLORADO SPRINGS, Colo. — A professional development seminar series designed to acquaint participants with structured program design methodologies and structured programming in Cobol and PL/I will be presented at several locations by the Cibar Systems Institute.

The two-day, four-session meetings covering design methodologies will focus on basic functional decomposition, composite design, program structure based upon data structure and stepwise refinement.

In covering structured programming in Cobol or PL/I, the seminars will include such topics as top-down design, hierarchy charts and program style.

The seminar will be given in San Francisco, April 24-27; Los Angeles, May 8-11; Washington, D.C., May 22-25; Chicago, June 12-15; and Dallas, June 26-29.

Tuition is $90. Cibar is at 2850 W. Serendipity Circle, Colorado Springs, Colo. 80917.

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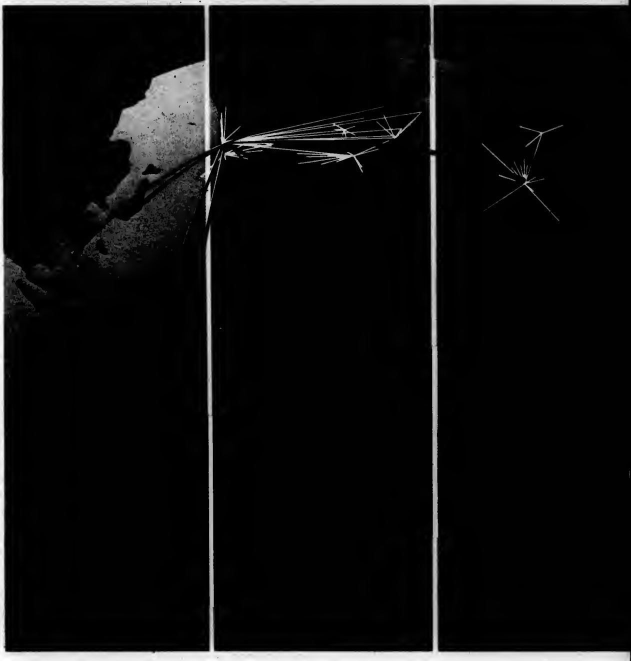

Written in Cobol

Program Written as Chess Buff's Research Aid

By Brad Schultz
CW Staff

ENGLISHTOWN, N.J. — A Cobol program that determines every possible legal move from any point forward in a chess game and performs other chess analysis — for example, finding "inevitable" mates — has been written here by one R.C. Smith and submitted to the U.S. Chess Federation for evaluation.

"R. Smith's Chess Explorer 1" (RSCE-1) was designed as a research tool for chess buffs. It does not play chess with anyone, but will generate quite an array of "trivia," Smith said.

For instance, the program automatically generates the information that after the first three half-moves — white, black, white — there are 8,902 possible three-move games, Smith explained, adding that the program also breaks down white's 8,902 possibilities as:

White	Number Of Moves
Queen's rook	100
Queen's knight	880
Queen's bishop	278
Queen	340
King	120
King's rook	100
King's knight	880
King's bishop	278
All pawns	5,926

From any point forward in the game, RSCE-1 can "play" and record on tape with printout every possible legal move for as many half-moves as the user requests, Smith said.

Typically the user would stipulate very few half-moves, Smith indicated, pointing out that 400 two-move games would be generated if someone requested the first two half-moves from the game's opening; but if someone requested a large number of half-moves, the system in theory would be committed to a tremendous amount of computation.

To cut down on the number of distinct games under scrutiny, the user may specify that on any three iterations only certain pieces can move, Smith said.

'Inevitable' Mates

To facilitate discovery of "inevitable" mate opportunities, the user can specify, for example, that white is the "aggressor," he continued: This would mean that, when white moves, only those moves placing the black king in check are accepted and written to the tape.

Under this option, all possible valid black moves are played and written to the tape. Only those moves taking the black king out of check would be valid and written to tape for the next iteration when white would again try checking the black king, Smith explained. This cycle would be repeated until black had no response, assuming such a state could exist.

Mates obtained via this method are written on an "exception listing," which is reviewed against the full printout of all games after each iteration, allowing determination of which discovered mates are inevitable, rather than simply "bad" moves by the opponent, Smith said.

With RSCE-1, the user has the option of playing on a "mini" chess board. For example, the board might consist of just 24 squares — instead of the conventional 64 — and involve four pawns, a king, bishop, knight and castle for each side, he noted.

Smith claimed the program can play on any size or shape board with appropriate adjustments for en passant, castling and pawn conversion routines.

RSCE-1 has the dubious distinction of probably being the

(Continued on Page 38).

processing will work for you?

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We began with the basics.

Small systems went to work in our factories, automating the testing of circuit boards and, later, hand-held calculators. The next step was linking these minicomputers with other factory systems so they could relay data and programs. The obvious need then was to tie these computers into an information network so that key managers could make decisions based on accurate, up-to-the-minute data.

As we continued to grow, we connected our widespread sales offices with the factories. Today we have 130 high-speed communications systems in 94 locations, sending compressed data via satellite and phone lines. About 12 million words a day come into our California headquarters. Yet the cost is phenomenally low. For example, we can send a ten thousand word message to Toronto in one minute for 85 cents. On a teleprinter, it would take 16 hours and cost $800.

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The keystone of our system is the HP 3000, a powerful general business system. It communicates with the HP 1000, a computer generally dedicated to design, test and control applications in the factory. (Both can also link directly with an IBM mainframe.)

Most long-distance communications between sales office and corporate headquarters are handled by the HP 2026, which can also take care of on-site editing. This keeps information (much of it off-loaded from the central computer) on-hand for local use, shrinking the amount of unusable data funneled to headquarters.

We've just introduced new software for the HP 3000 that makes it an even more powerful management information tool. You can, for instance, sit down at your computer in New York and use all the processing power and data base of your Los Angeles computer—or any other HP 3000 in your network. Software is also available to tie HP 1000 systems together in a plant-wide information sharing network. So you can find out exactly what's going on in your business—from the ground up.

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1100/OS Gets Conversational RJE

DALLAS — Time-sharing with a special remote job entry (RJE) feature is now available with University Computing Co.'s (UCC) 1100/OS.

Conversational Time-Sharing (CTS) provides "conversational" RJE, allowing the user to create and edit programs and data in an interactive mode and then submit them for batch processing, a UCC spokesman said, noting CTS allows the firm to address the lowspeed, interactive time-sharing marketplace.

With CTS, the user receives diagnostic line-by-line syntax checking and program compilation, he said, adding that the user can interrupt his program during execution to edit and then resubmit the job, enhancing control of his output and associated costs.

Basic, Fortran and Cobol are available with CTS as well as the UCC relational DBMS (DBIV) — all in interactive mode. CTS is also said to support 30 char./sec Ascii terminals.

The cost of CTS varies with the particular user situation, the firm said. UCC can be reached at 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

Chess Research Tool Programmed in Cobol

(Continued from Page 37)

only chess program written in Cobol, Smith said, noting Assembly language would have been more appropriate. He explained that since his own programming experience has largely been with Cobol and this project had to be conducted in his own free time, he wanted to stay with a familiar medium.

The program employs two tape drives and 57K of core and runs in an IBM 370/158 VS environment, he said, adding that communication with the program is accomplished through control cards filled out by the user.

Not a Player

"I should point out . . . that I'm not a chess player by training, aptitude or inclination and, further, that I've no knowledge of what work has already been done in the field of 'computer chess,'" Smith wrote U.S. Chess Federation Executive Director Martin E. Morrison.

"Briefly, my academic background is in philosophy (a long time ago) and my business experience has been in commercial DP . . . Currently, I'm a systems manager with a major consumer goods company," he stated.

On Own Time

"Accordingly, I've undertaken this project purely on my own time in response, initially, to my philosophical interest in the problem of being able to theoretically play and record all games and more significantly in the problem of what could be done with such knowledge if it were available," he added.

R.C. Smith can be contacted at 20 Chaucer Road, Englishtown, N.J. 07726.

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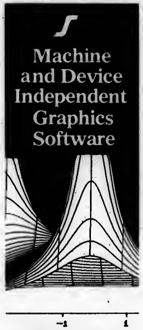
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By Encouraging Competition

FCC Sparked Services in Canada: Sharp

By **Ronald A. Frank**
CW Staff

TORONTO — If it were not for the Federal Communications Commission (FCC) in the U.S., many communications services now available in Canada would not have been introduced, according to Ian P. Sharp, president of I.P. Sharp Ltd.

Speaking at the opening session of the recent Data 78 conference here, Sharp said Bell Canada has tended to react to FCC actions. If the U.S. commission did not favor competition and innovation, fewer Canadian communications services would be available to users.

Common carriers are in the business of protecting and enhancing revenue. This is what the Dataroute and Datapac services in Canada were aimed at, he said.

Carriers are attempting to eliminate private-line networks by replacing them with measured service. The carriers will not be allowed to stop offering private lines but instead will implement rate hikes totaling 50%, Sharp predicted. General Electric Co. has already been refused flat-rate private lines to Hong Kong, and there will be no private lines within France by mid-1978, he said.

Consultant Dixon Doll told session attendees that a debate will develop in the next few years over the merits of private vs. public data nets. Although packet nets are becoming more widespread, many users want to stay in control of their destinies and therefore prefer private-line links, he said.

CW
At Data 78

CW Photo by R. Frank

Dixon Doll

Many organizations have vested interests in the shape of future networks and some could use pricing to push the method they favor most, he said. Up to now, there is no evidence that pricing has been used as a weapon, but this is a real possibility, according to Doll.

The computer industry and the communications industry are both looking for ways to expand, and as new technology is developed, the historical boundaries between the two are becoming blurred, he said.

Substantial modifications are required today for users to shift from in-house private nets to public nets. The special Systems Net-

(Continued on Page 40)

Variety of Terminals Gain Link to Packet-Switched Net

By a CW Staff Writer

TORONTO — Daedalus Micro-Electronics Ltd. has introduced one of the first terminal interface devices for packet-switched networks.

Shown at the recent Data 78 conference here, the DME 101 is a microprocessor-controlled unit that allows users to attach IBM 3270 binary synchronous terminals, as well as 2780, 3780 and 360/20 workstations, to the Canadian Datapac network.

The initial version, called the Datapacer, allows users to interface to the packet net without making the terminals directly compatible with the Snap protocol required on Datapac, according to a Daedalus spokesman.

The Datapacer reportedly uses LSI technology and an EIA RS-232 "crosspoint controller" designed for packet technology. A resident firmware supervisor controls internal "resources" and data paths. Customer-selected options are said to be maintained by a read-only memory accessible from the supervisor.

The controlling firmware consists of a Network Transmit Controller (NTC), Device Transmit Controller (DTC) and the Supervisor/Crosspoint Controller (SCC). The NTC is the Datapac transfer and control interface, dedicated to data and control

(Continued on Page 40)

IBM Software Strategy Held Basis of Four User Problems

TORONTO — IBM's decade-long strategy of placing all communications software control at a central mainframe site has presented four major problems to users, according to Robert Budenstein of Paradyne Corp.

Speaking at a recent Data 78 session dealing with the economics of virtual data links, Budenstein told attendees that transactions between the mainframe and remote peripheral devices within IBM nets are controlled by the mainframe "through a front end driven by complex and costly teleprocessing software systems."

The first of the four problems is the cost of the personnel needed to develop and to maintain such IBM teleprocessing software as Btam, Tcam, Rtam and, most recently, Vtam. In many cases, an organization must assign its most highly skilled software engineers to the task of teleprocessing system design and maintenance, he noted.

The second issue network builders must face, according to Budenstein, is the time involved in developing and maintaing teleprocessing software.

The third is the cost of equipment at the central site, as well as at remote locations. This issue, too, is directly affected by the complexity of teleprocessing software.

(Continued on Page 40)

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IBM Strategy Seen Impacting Users Four Ways

(Continued from Page 39)

The fourth problem involves communications line charges. With all network control at the central site, a separate line is normally required for each remote peripheral device, making even small networks prohibitive for many prospective users, he said.

Evolutionary Development

The evolution of centralized communications control began at a time when all computing was local, Budenstein pointed out. Systems were simple, consisting typically of a central processor, a card reader and a line printer. One small software routine allowed the user to read cards while another permitted printing.

Even when multiple card readers and printers were added, he recalled, there was little need for concern with error detection or recovery because each of those peripheral devices was connected directly to the processor..

Concern with error conditions arose when card readers and line printers were installed at remote sites; users then had no adequate means of determining the quality of communications lines. IBM responded by developing a "dumb" box, initially the 270X, Budenstein said.

The function of the 270X was to take a data stream coming from the central processor and convert that data for transmission down two-wire or four-write communications lines. The 270X had a built-in error detection capability, but no means of correcting the errors it discovered. That job was left to the mainframe, he noted.

Satisfactory Protocol

Considering the Binary Synchronous protocol then in use, Budenstein explained a block of data was transmitted and the system had to wait for acknowledgment (ACK) or negative acknowledgment (NAK) before transmitting the next block of data or retransmitting the first block.

That protocol was satisfactory because users at that time were just getting their feet wet in communications, he said; line speeds were limited to 2,400 bit/sec or less and few people dreamed of requirements beyond that.

Attempt at Improvement

In its Systems Network Architecture (SNA), IBM is attempting to improve the efficiency of that communications scheme, Budenstein said. One phase of those attempts has involved the elimination of Binary Synchronous protocol in favor of a more continuous transmission of data.

To that end, IBM supplied a protocol in which seven blocks of data can be transmitted before an acknowledgment is required, Budenstein said. Theoretically, a response would have been received from transmission of the first block before transmission of the seventh block.

At the same time, some of the communications functions which had previously been handled in teleprocessing software were moved into the front end, formerly a nonintelligent device, which grew to become the 370X.

With responsibility for Network Control Programming, the front end became a computer requiring as much as 180K bytes of memory. The basic communications scheme remained the same, however, including a front end and remote communications protocol.

That communications scheme results in relatively low communications speed and low efficiency, he contended. IBM rarely allows line speeds as high as 9,600 bit/sec and limits the number of remote peripherals possible in a network, he said.

Virtual Data Link

The concept of a virtual data link evolved when the decision was made to eliminate the telecommunications protocol altogether rather than work around it, according to Budenstein. The use of similar "boxes" at both ends of a communications line, or at each node within a distributed computing network, provides an efficient alternative to the IBM front-end structure, he said.

This alternative makes extensive use of technology that was unavailable when the IBM front-end structure was originally developed.

The PIX communications scheme from Paradyne Corp. does not involve the shifting of teleprocessing software; instead, devices are defined in such a way that software is not necessary, Budenstein said. Once the data has been transmitted from the mainframe to the PIX controller, it can be transmitted downline from that device in Sychronous Data Link Control (SDLC) protocol along any transmission system.

Intelligence at both ends of a communications line improves the flexibilty with which peripherals can be located at remote sites. A front end communicating with a 2780 over a single line, for example, cannot communicate with additional devices unless multiple lines are established, he said.

Agency Sparked Offerings

(Continued from Page 39)

work Architecture (SNA) Datapac interface available in Canada is a "scaffolding approach." IBM has to accept the fact that packet nets already provide a variety of functions.

The implementation of datagrams on packet nets is still two years away, the consultant said, and major contenders are jockeying for position while IBM sits back to see what happens.

Palle Kjar, director of the computer communications group of the Trans-Canada Telephone System, agreed, saying there will be less emphasis on technology and more on applications needs. Many countries are implementing public nets and some of these will jump right into packet technology, thereby bypassing earlier types of networks, he said.

Richard Taylor, president of Data Crown Ltd., served as conference chairman, welcoming attendees and predicting that computers and communications will create a Canadian infrastructure that ultimately could replace autos and food processing as Canada's largest industry.

Data 78 was the first Canadian conference dedicated to data communications and recognizing the importance of this area, Taylor said.

Terminals Gain Packet Net Link

(Continued from Page 39)

transfers on the Datapac network,

The SCC and the NTC are capable of transferring data buffers and handshake control transfers across the Canadian packet network, the spokesman said.

The DTC was described as the "dialogue-dependent interface for host and terminal."

Although presently available only for use on the Datapac network, a spokesman said the unit will be provided also for Telenet and Tymnet networks in the U.S.; the Infoswitch network in Canada; and the Transpac network in France.

With the DME 101, users can mix protocols and vendors and the requirement for network interface machines is eliminated, the company said.

Prices in Canada for the Datapacer are $200/mo per synchronous device port and $300/mo for eight asynchronous devices. The unit is limited to 9,600 bit/sec because this is a limitation of the Datapac network. The DME 101 can operate at speeds up to 50 kbit/sec, Daedulus said.

In addition to IBM devices, the spokesman said, Daedulus is considering support for Honeywell Information Systems, Inc. and Univac terminal protocols. A Synchronous Data Link Control/System Network Architecture (SDLC/SNA) capability is reportedly being planned and DME 104 will soon be available in the U.S.

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Terminal-Based Net Details PBX Malfunctions

SEATTLE — PBX system malfunctions at Pacific Northwest Bell here are being diagnosed with the aid of a terminal-based system that classifies problem areas by customer, type of PBX, geographical location and other variables.

Using AT&T Dataspeed 40 CRTs, the system enables the phone company to conduct the analyses necessary to pinpoint trouble trends or areas by accessing the Tymshare, Inc. DP network. It also enables management to set priorities for preventive maintenance of PBX systems and to determine future manpower requirements for maintenance.

The analysis is done on an IBM 370/168 CPU at Tymshare's Cupertino, Calif. DP center.

According to Chuck Trapp, customer service staff supervisor, the system has greatly reduced the paperwork involved in PBX maintenance since it went into operation last May.

Developed by Tymshare's telephone industry marketing group, the system which uses Cobol, is now in operation throughout the Washington-Idaho area. This area includes 26 customer service operating units (CSOU) responsible for the maintenance of 762 PBX systems.

The system provides PBX maintenance supervisors with an estimated routine maintenance report, a master equipment test list, a PBX work schedule, corrective and preventive maintenance reports and district inventory reports summarized from CSOU to district to division to department.

The system also enables phone company managers to order special reports in a virtually unlimited variety of formats for comparison and analysis, Trapp said. For example, if a marketing executive is receiving numerous complaints about a particular kind of PBX, reports can be ordered to determine whether the problem is with a specific component or within a particular CSOU.

Pacific Northwest Bell's PBX maintenance was a manual system prior to the installation of the Tymshare system, Trapp said.

The data base is stored in Tymshare's CPU in Cupertino, which handles all the processing. Telephone company personnel communicate with the CPU via the Dataspeed 40 CRTs.

"From the over 700 PBX systems now included in the system, we receive approximately 2,500 to 3,000 trouble tickets each month," Trapp said. "Previously we had to read these tickets, compile them and manually analyze them.

"Now the information on the tickets is entered into the CRT and the analysis is done automatically. And it's summarized from one level to the next to give us a better overall picture of what's going on," he added.

The Tymshare system produces among other reports a district inventory that lists by district the telephone number of each customer, the address, the type of PBX, the location of the PBX and the number of stations the customer has.

This report has relieved district managers of the burden of manually preparing quarterly inventory reports, Trapp said.

"I enter the initial inventory into the computer creating a data base," he said. "That data base changes very little after that, but when equipment is added or subtracted from a PBX system, I simply add that information to the data base and we have an up-to-date inventory list in the computer.

"I'm extremely pleased with the results we've been getting from this system," he added. "It's relieved the field supervisors of a tremendous amount of paperwork while providing us with more comprehensive analyses than we've ever had before."

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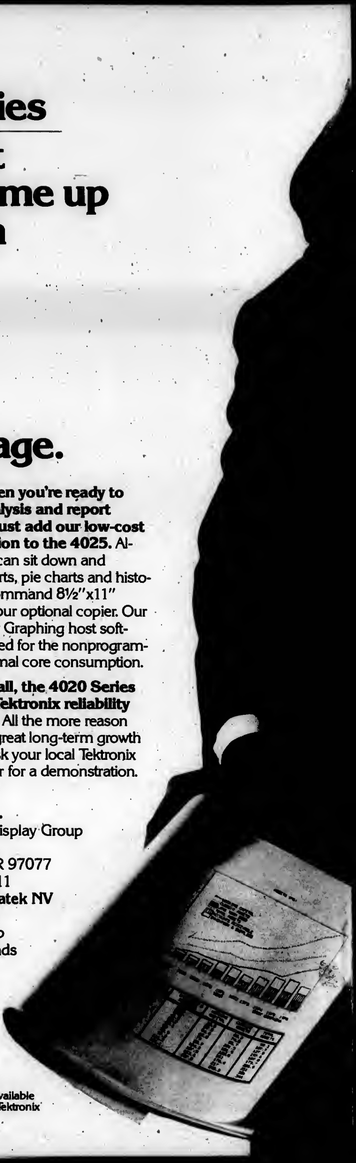

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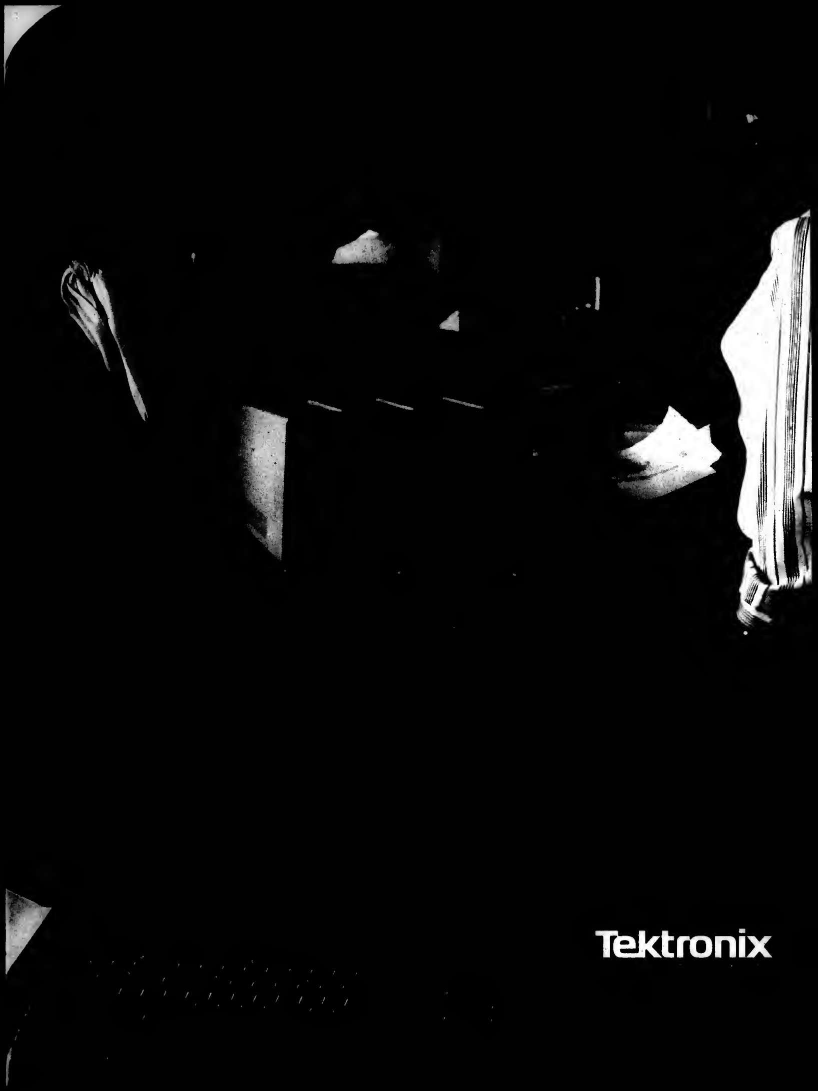

Tektronix

Olivetti TC 800 Terminal Gains Dual Keyboard

NEW YORK — Olivetti Corp. has introduced the TC 800 dual-keyboard financial terminal system, an enhancement of the TC 800 financial terminal sytsem line.

The dual-keyboard TC 800 is an on-line terminal system that can be configured either as a two-workstation stand-alone unit or as a two-workstation satellite system in a clustered master/satellite terminal environment, Olivetti said. In either type of configuration, the TC 800's resident intelligence provides for teller prompting, transaction processing and simultaneous editing and verification at both workstations, a spokesman noted.

On-line communications connection is controlled in the TC 800 stand-alone terminal and accomplished through the TC 800 master terminal in a clustered master/satellite configuration. Transactions can be processed off-line by either configuration with no change required in operator procedures, according to the spokesman.

Three CRT Units

Three different CRT units are available, offering screen capacities of 260-, 480- and 1,920 characters. Numeric and alphanumeric keyboard/consoles with up to 38 function keys and an optional magnetic stripe debit/credit reader are also available.

For printed output, the choices include document/passbook printers and optional document feeders and integrated magnetic stripe reader/-encoders and four auxiliary printers with speeds from 100 char./sec to 600 lin/min.

For program and data storage, floppy disk, disk cartridge, magnetic tape cassette, 7- and 9-track magnetic tape and punched card devices may be included, Olivetti said. An optical character wand for reading optical character recognition (OCR) documents is also available.

Micro With ROM, RAM

Each TC 800 has its own microprocessor which includes read-only memory (ROM) for controlling program execution and random-access memory (RAM) for application programs and host computer intesface. Each terminal unit also has 16 I/O channels to support the components which make up the workstations.

Either single- or dual-keyboard workstations are developed by connecting the desired combination of components to the TC 800 control unit. A dual-keyboard two-workstation unit typically includes one controller, two keyboard/consoles, two CRTs and one passbook printer.

The TC 800 intelligence is resident in each terminal and is thus shared by, at most, two workstations. In addition, each keyboard/console has four teller identification keys to provide for teller changeover or an optional debit/credit plastic card reader, Olivetti said.

The price of a typical dual-keyboard TC 800 with one controller, two CRTs, two keyboard/consoles and a passbook printer starts at about $12,500. Olivetti Corp. Financial Terminal Products is at 500 Park Ave., New York, N.Y. 10022.

Course to Cover Digital Satellites

WASHINGTON, D.C. — A course in "Digital Satellite Systems and Technology" will be given June 12-16 at George Washington University here.

The course is designed for engineering managers, engineers and others who need an understanding of the concepts of digital satellite systems and the technology involved in their implementation.

Background Provided

The topics covered will provide the background necessary to design and evaluate the digital satellite systems which will play a major role in the communications systems for the future, according to a spokesman for the university.

Both the central system concepts and practical implementation issues will be discussed so participants can obtain a balanced view of the area, he added.

The course fee is $575. Further information is available from the Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Datec 32 Works For Bell 103/113

CHAPEL HILL, N.C. — The Datec, Inc. Model 32 acoustic coupler provides Bell 103/113-compatible duplex or half-duplex 300 bit/sec data communications, according to a spokesman.

Both transmitter and receiver incorporate crystal-controlled CMOS digital integrated circuits for FSK frequency generation and discrimination. A signal-quality carrier detector circuit eliminates false carrier indication and permits channel establishment with signals as low as -55 dBm, he added.

A single female connector provides both EIA RS-232 and 20mA teletypewriter-compatible interfaces. Simultaneous operation of two data terminals is possible with a terminal splitter attachment, Datec said.

Priced at $395, the Datec 32 is available from the firm at P.O. Box 839, Chapel Hill, N.C. 27514.

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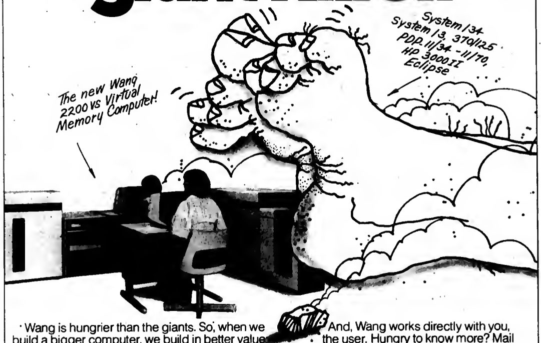

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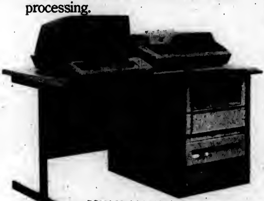

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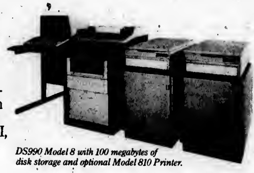

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Using CRT Terminals

Auto Parts Inventory Net Improves Service

ATLANTA — Genuine Parts Co. (GPC) enables National Automotive Parts Association (Napa) jobbers and their customers to share the benefits of a terminal-based inventory control system. The resulting improvements in service are said to include instantaneous recall of any part in the current inventory.

The network reportedly reduces costs by increasing the sales capacity of the salescounter staff by 30% and by improving inventory turnover for the stores in the Napa chain.

The system, called Total Automotive Management Systems, was designed to be operated by existing store personnel and performs point-of-sale invoicing, inventory updating and price updating. It also provides business summaries such as sales and inventory analyses, lost sales reports and measures of gross profit per sales counterperson, a spokesman said.

Terminal Transactions

The terminal system was designed for the Napa jobber having a store volume as small as $25,000/mo. The system requires minimal changes in the operation of the store.

To join the Tams network, the jobber purchases a turnkey minicomputer system from GPC, a national Napa distributor headquartered here, officials explained.

System Operation

When a requested part is keyed into the system, its price and availability are displayed. If the part is purchased, an invoice is printed and the inventory is automatically updated. If the part is not available from stock and the customer wishes to order it, the required information is keyed into the system and stored until the end of the day, a spokesman said.

At the end of the day, the Tams system automatically produces required reports and prepares the minicomputer for communication. During the night, the GPC DP center located in the jobber's region polls the minicomputer for its order and accounting transactions.

The DP center processes the information and communicates the order to one of GPC's Napa distribution centers. The distribution center fills the order the next business day by delivering the part before the jobber's store opens the next morning, a spokesman noted.

Also during the night, the regional center polls the minicomputer for the second time to communicate to the jobber the status of his order and inventory data. The minicomputer processes this information and automatically updates the inventory with the items shipped or back-ordered and any price changes or other inventory maintenance data.

Hardware Set-Up

The system located in the jobber's store consists of a Data General (Corp.) Nova 3 with a 64K-byte memory, a 10M-byte disk, a Model 6031 diskette, Model 6012 CRTs and a Model 6040 Dasher printer. Should the jobber's store volume exceed the capacity of the standard Tams system, he can upgrade this configuration by adding disk and main memory capacity, officials noted.

To minimize communications costs, the system communicates with the regional center over full duplex 1,200 bit/sec asynchronous dial-up phone lines using a Vadic Corp. modem. Each regional center communicates with the jobber's system with a satellite processor consisting of a Nova 3 configuration similar to the jobber's, but also including a Model 6020 magnetic tape subsystem and a synchronous line adapter.

The satellite processor communicates with an IBM 360/40 host located in the regional center via tape or over 2,400 bit/sec synchronous dial-up lines. The regional center communicates with the distribution center's IBM 360 CPU over 4,800 bit/sec synchronous dial-up lines.

The Tams network will eventually be available to most of the Napa jobbers served by the 39 distribution centers operated by GPC from the company's seven regional DP centers located in Atlanta, Ga.; Memphis, Tenn.; Denver, Colo.; Columbus, Ohio; Portland, Ore.; Fresno, Calif.; and Middletown, Conn., the spokesman said.

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Pay-by-Phone Capability Offered as Turnkey System

SEATTLE — Telephone Computing Service, Inc. has introduced the turnkey 354 system which reportedly allows any financial institution to offer a telephone bill paying system in three months.

The system comes equipped with a Digital Equipment Corp. PDP-11/34 processor, two teller CRTs, two DEC RK05 expandable disks and one 100 line/min printer.

As the system is expanded, interactive and batch processing are performed simultaneously; account balances from the host can be loaded automatically via magnetic tape, a spokesman said.

Several options are available to provide for automatic account balance updating on the host, he added, including an IBM 2780 communications package interface, IBM floppy disk interface, magnetic tape interface, or use of Pay-by-Phone activity records encoded in magnetic ink character recognition (Micr); the words can be handled by existing check processing equipment.

The system can support a multiinstitution environment as well as an optional voice-response unit. Preauthorized and post dated payments are standard features.

The system generates monthly and year-end statistical reports for management as well as an annual budget report for customers.

Beginning at $65,700 or $1,500/mo leased, an institution can obtain a system capable of expansion to 15,000 Pay-by-Phone accounts. The price includes operations, training and implementation support, including documentation package.

Telephone Computing Service is at 1115 Eastlake Ave. East, Seattle, Wash. 98109.

Free Catalog Overviews Communications Publications

NEW YORK — Users who need a concise overview of current books available in the area of telecommunications can get a free 32-page catalog from The Telecom Group.

Including both technical and general publications, the catalog provides an indexed listing that covers most aspects of telecommunications, including topics that apply to corporate communications operations.

The catalog includes hard-cover volumes with a listing of the books written by James Martin. Also included are descriptions of soft-cover instructional books and periodicals.

The catalog includes recommended packages depending on level of expertise and area. As an example, "beginning data communications users and/or managers" are advised to start with five selected volumes.

The library contains books from 30 publishers. The volumes were selected by Harry Newton, a telecommunications consultant who is president of the Telecom Group. A search service is available for users seeking books not in the library.

The publication is available from The Telecom Library, Suite 11-C, Three Sheridan Sq., New York, N.Y. 10014.

IDS 3901 Unit Includes Diskette

VAN NUYS, Calif. — A fast-access intelligent buffered terminal has been introduced by Interdyne Co. The Model IDS 3901 uses a 5.75-in. industry-standard diskette drive and is RS-232C compatible, according to a spokesman.

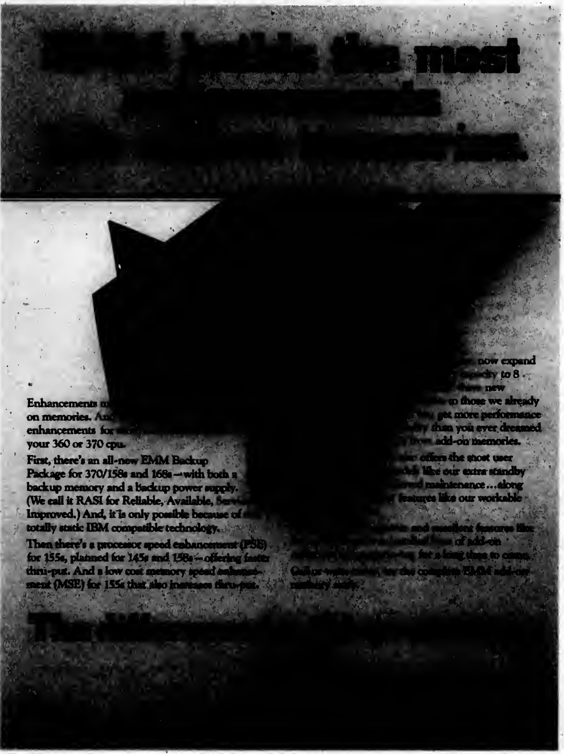
Average access time is .6 sec. The unit has a fully editable data buffer holding up to 128 characters and a block rewrite capability and allows insertion of blocks or entire paragraphs into previously written text, he added.

It includes an automatic high-speed block search and verify as well as character pattern search under operator control or prerecorded instructions. It is controlled by 30 Ascii commands and outputs 13 plain English messages.

Other features include storage of 143K bytes formatted per diskette, switch-selectable asynchronous transmission rates from 110- to 19,200 bit/sec Ascii text as well as transparent binary modes and auto error check and retry, the firm said.

By adding the IDS 3901 to CRT-keyboard, users can have an intelligent system with store and forward capability for program preparation and loading, data entry and storage, text editing and off-line printing, Interdyne said. The command structure and performance is similar to Interdyne's serial Interfaced Cassette System, ICS 3801, but has faster access time, it noted.

The IDS 3901 costs $2,050 from Interdyne at 14761 Califa Street, Van Nuys, Calif. 91411.


[illegible] the most [illegible]

Enhancements [illegible] on memories. An[illegible] enhancements for [illegible] your 360 or 370 cpu.

First, there's an all-new EMM Backup Package for 370/158s and 168s—with both a backup memory and a backup power supply. (We call it RASI for Reliable, Available, Serv[illegible] Improved.) And, it is only possible because of [illegible] totally static IBM compatible technology.

Then there's a processor speed enhancement (PSE) for 155s, planned for 145s and 158s—offering faster thru-put. And a low cost memory speed enhancement (MSE) for 155s that also increases thru-put.

[illegible] now expand [illegible] capacity to 8 [illegible] three new [illegible] to those we already [illegible] get more performance [illegible] than you ever dreamed [illegible] from add-on memories.

[illegible] offers the most user [illegible] like our extra standby [illegible] maintenance...along [illegible] features like our workable [illegible]

[illegible] and excellent features like [illegible] of add-on [illegible] for a long time to come.

Call or write [illegible] for the complete EMM add-on memory [illegible]

Port Selector Enhanced

CHERRY HILL, N.J. — Infotron Systems Corp. has expanded the capabilities of its Timeline 450 port selector. The 450 extends CPU terminal-handling capability by having incoming lines contend for available ports rather than dedicating ports to lines which may not be in use; users can add terminals without having to add computer ports, Infotron noted.

The enhanced model accommodates both synchronous and asynchronous input at mixed speeds to 9,600 bit/sec. UP to 254 lines can contend for up to 32 ports; up to 32 of the 254 lines may be synchronous and contend for up to 16 of the 32 computer ports, according to a spokesman.

Port selectors handling all asynchronous traffic to 1,200 bit/sec will allow the 254 lines to contend for as many as 124 ports, he said, adding the units already in the field can be upgraded with the enhancement.

The port selector connects the incoming call to the first available port in the desired computer and passses the ABR character through to the front end. The ABR feature recognizes 110-, 134.5-, 150-, 300- and 1,200 bit/sec.

A typical system of asynchronous and synchronous lines with 16 lines and eight ports costs about $6,000. Infotron is in Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

FCC Authorizes AT&T To Add 42 Cities to DDS

BEDMINSTER, N.J.— AT&T has received authorization to add 42 more cities to its Dataphone Digital Service (DDS), bringing the total to 66.

The company said the Federal Communications Commission (FCC), after initially accepting a recordkeeping system, granted the authority to expand the service. The commission previously gave conditional approval to the expansion last June 8.

DDS is a private-line service used to transmit data in digital rather than analog form. The service utilizes Data Under Voice technology to transmit data over a generally unused portion of microwave channels.

The 42 new metropolitan areas include: Birmingham and Huntsville, Ala.; Phoenix, Ariz.; Anaheim, Inglewood, Mountain View, Oakland (East Bay), Sacramento and San Diego, Calif.; Wilmington, Del.; Jacksonville and Orlando, Fla.; Indianapolis, Ind,; Des Moines, Iowa; Louisville, Ky.; New Orleans, La.; and Springfield and Worcester, Mass.

Other Locations

Also, Omaha, Neb.;, Charlotte and Raleigh, N.C.; Trenton (Hamilton Square) and Camden, N.J.; Albany, Buffalo, Rochester, Syracuse and White Plains, N.Y.; Akron, Cincinnati, Columbus, Dayton and Toledo, Ohio; Oklahoma City and Tulsa, Okla.; Seattle, Wash.; Allentown and Harrisburg, Pa.; Providence, R.I.; Memphis and Nashville, Tenn.; and Salt Lake City, Utah.

The service was first offered in December 1974 and is currently available in 24 cities. It now provides end-to-end digital data transmission at speeds between 2,400- and 1.544M bit/sec.

Last July, the company also asked for authority to expand the service to an additional 30 cities. These, if added to the latest FCC authorization, would bring the total to 96. That request is still pending with the FCC.

The first cities in the authorized 42 will be added before the end of this year, with all added to the DDS network by early to mid-1979, a spokesman said.

Model 43 Teleprinter Offered With Coupler

PARK RIDGE, Ill. — The Model 43 teleprinter from Teletype Corp. has been introduced with an acoustic coupler by Management Response Corp. (MRC).

The desktop terminal features a full Ascii character set and buffered 10- or 30 char./sec operation, according to a spokesman. It prints up to 132 upper/-lower case char./line on regular paper.

Equipped with the acoustic coupler, the Model 43 is available for $1,285 or, on lease, $38/mo.

MRC is at 660 Busse Highway, Park Ridge, Ill. 60068.

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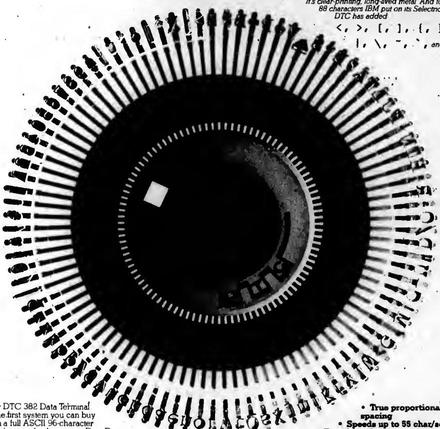

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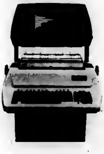
- **Worldwide fast service**

Write, TWX or call Ron Lampe for additional information. Data Terminals and Communications, 1190 Dell Ave., Campbell, CA 95008. (408) 378-1112. TWX (910) 590-2436.



Our Model 382 offers a four-page video option to save composition time and scratchpad paper. It has seven field attributes which may be used singularly or in combination

DTC

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Canadian User Examines Technology

Page Printers 'Revolutionizing' Output

By Robin Hornby
Special to CW

EDMONTON, Alberta — The high rate of technological advance that typifies the computer industry has until recently had little effect upon the visible product of DP, namely, the printed output.

Until now, batch output has been entirely produced using impact printers characterized by "hard type" printing, with performance limited by the inherent mechanical nature of the process. Although the development of print trains allowed the installation of special slugs to meet nonstandard requirements and print speed was improving (roughly doubling every six years), it is the introduction of page printers that is revolutionizing the print environment.

These new printers will offer at least 10-fold improvement in print speed as well as a high level of software flexibility ready to be exploited.

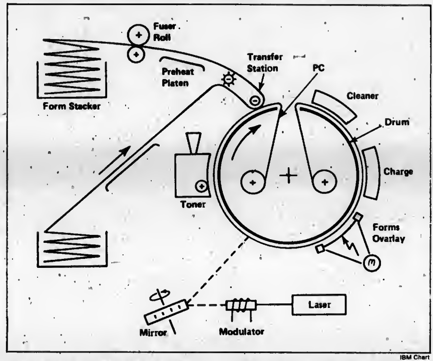
Planning Problems

However, implementation of this new generation of output printer can cause planning problems as these capabilities come at a time when many users are learning to reduce their printed report needs by using techniques like exception and demand reporting or computer output microfilm (COM) and CRT technologies. These trends should be encouraged because they usually lead to reduced costs and greater business efficiency, leaving the facilities analyst with a greater responsibility for determining real application requirements before turning to the page printer for solutions.

Nevertheless, some cases show that high-volume printing is obviously a need, at least within the foreseeable planning horizon; an example of this would be customer billing within the telephone industry.

In implementing these new subsystems of Alberta Government Telephones (AGT), our experience has been with the IBM 3800 printing subsystem. Other machines are now available which use electrostatic principles, but a brief description of the process used by IBM should give an appreciation of machines of this type.

The machine attaches to a channel (generally a block multiplex) and appears to the application program as a conventional impact line printer. The 3800 is driven by its own miniprocessor with 52K bytes of memory, wherein print lines received from the channel are buffered prior to printing a page at a time. The printing process is "impactless" and relies on light pulses to form the character, which is printed as instructed by the digital blueprint stored in memory.



IBM Chart

As the drum on the IBM 3800 printing subsystem turns, it passes the following points: charge, which prepares the photoconductor to receive a new image: forms overlay, which passes light through a film negative, projecting a design image on the photoconductor; laser, which creates designated characters on the photoconductor; toner station, which applies toner to the photoconductor; transfer station, where character images are transferred to paper; and the cleaner, where residue toner from a previous page image is loosened and removed.

A stack of continuous-form paper, loaded at the 3800's input station, flows through the image transfer station, over a preheat platen and past a fuse roll, which fixes characters on the paper.

The paper is then automatically refolded on a form stacker.

The software implementation of character sets allows the programmer to control the type style to be used; we now have a range of options from 10-, 12- to 15-pitch in upper-and lower case available.

Furthermore, the selection is open-ended insofar as user-designed graphics can be loaded by the processor. This opens up applications using company logos and mathematical and electronic symbols as well as circuit diagrams and graphical reports.

This flexibility is possible because of the programmable 18 by 24-bit character descriptor stored in memory for each member of our character set. The matrix pattern is used by the miniprocessor to modulate pulses of coherent light from a gas laser so as to cause an exposure to light of the desired character shape. A maximum of 255 character descriptors may be stored in memory during any one print job.

A page of data is built up by exposing to laser light the selected dot elements of each character on each line under the control of scanning logic. The exposure actually occurs on a large drum coated with photoconductive material that rotates at a constant speed while printing.

The electrostatic field created by the light pulses attracts toner to the surface of the drum, which is then electrostatically transferred to the paper, forming a black character with excellent definition and contrast characteristics. The toner is then fused onto the paper to form a permanent image.

Regular fan-fold stocktab is used, although the form size and form usage can be significantly reduced by increasing the pitch and number of lines per inch of the output, consistent with the needs of the application. In our case, a 12- by 8.5-inch form is standard, immediately yielding a 20% volume saving.

In an environment where forms costs take the major share of the printing subsystem

(Continued on Page 66)

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Verification Program Cuts Dairy Record Errors

By Lynn Tilton
Special to CW

PROVO, Utah — The DHI Computing Service here has developed a verification system that has helped reduce input errors and increase throughput 30% in its dairy records department.

The department has attained an average of 22,000 keystroke/hour on the company's IBM 3742 data stations, according to Dr. Bliss Crandall, founder and president of the large private dairy computing center.

The average is possible because the old method of having an experienced checker redo a new clerk's work has been replaced with the practice of having two clerks key the same material. The checker only has to determine errors when there is a difference in figures, Crandall said.

"The material is independently entered into our IBM 360/50 or our IBM 370/138 backup CPU where it is sorted. The discrepancies appear on the IBM 3270 CRT terminal. The checker then marks the correct figure, eliminating the error," Crandall explained.

Two-Level Verification

After the work has been checked, one of the 512K-byte computers edits data on one of two levels. The first, a standalone edit, rejects figures that are out of the reasonable range.

At the second level, the CPU checks each cow's milk production record against that of the previous month to ensure there has been no mistake. "If the later month's report indicates the cow doubled the previous month's production, we know we have an error," Crandall said.

He noted that anything keyed in the department is done twice and computer-checked twice. "There is no such thing as an error-free operation, but the error level is much lower than the industry average," he claimed.

The verification program was written by Lynn Crandall, vice-president of systems and programs at DHI.

Although the program was responsible for the throughput increase, another factor was incentive pay for clerks.

Data Entry Dimensions

"We adhere to the wage and hour laws, but experienced people are paid according to production. We don't pay for errors, but we don't penalize for them either," Bliss Crandall explained.

The computers keep track of each clerk's throughput, and from this paychecks are computed, he reported.

"We don't pay by the hour, nor is a good worker kept down by a seniority system," he said, explaining that new workers are placed on a guaranteed base salary, then moved to the incentive system after the error rate is down and their production is up. "We find we have a very low error rate with the system, despite the temptation to let the error stand and have it corrected by the checker or discovered by the computer," he said.

"Our top workers get a far better wage than they would on an hourly basis," he claimed.

The system allows for flexible hours, so there is no problem with tardiness, people leaving work early or extended coffee breaks, Crandall said.

"All we want is enough manpower to get the work done. Usually it is completed by 3 p.m.," he said.

(Continued on Page 63)

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DIGITAL, APRIL, 1978.

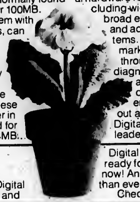
DIGITAL SPINS THREE NEW DISKS: $900, $450, AND $300 PER MEGABYTE.

The cost of disk capacity just plunged dramatically with the introduction of three new Digital disks.

The first is the new RL01, a 5MB cartridge disk, featuring an embedded track following servomechanism, universal power supply, and extraordinary simplicity—just 5 modules and 11 subassemblies. The RL01 plus controller is the lowest priced disk subsystem available from any minicomputer manufacturer. A typical RL01 subsystem, with a controller and two drives, offers 10MB for under $9,000...that's only $900 per MB.

The new RK07 is a mid-range (28MB), high performance cartridge disk drive with features normally found on expensive drives over 100MB. And in a typical subsystem with controller and two drives, can provide 56MB for only $25,000...$450 per MB.

And the new RM02 provides 67MB capacity for UNIBUS systems at the lower-than-ever price of $18,000. Put two of these together with a controller in a typical subsystem and for just $41,000 you get 134MB... just $306 per MB.



All the new disks deliver exceptional hardware reliability features including wide design tolerances, broad environmental specs, and advanced cooling systems. And you get remarkable maintainability through sophisticated diagnostic software, modular assembly, easy-access design, and extensive error reporting. To find out all about them, and Digital's commitment to disk leadership, check the box.

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It's the second in a series of Digital catalogs of new applications programs for educators. *IDEAS: VOL. 2* gives teachers and administrators a close-up look at the 270 newest and best software packages available from publishers across the country. Subjects include administration, social science, math, CAI, and games, among many others. For your free copy, check the coupon.

DISTRIBUTED COMPUTING: WHY THE COOKIE DOESN'T CRUMBLE.

From England comes the tastiest application story of the month. A major bakery, with a capacity of 1.25 million cookies per hour, has replaced the batch computing equipment on its factory floor in favor of a distributed computing network, hosted by a PDP-11/40.

Forty-one data entry, video display, and video monitoring units, run by five microprocessor nodes, are connected to the host processor through a Digital DUP-11 synchronous interface. A PDP-11/03 acts as a front-end processor for the host in a star-loop network that monitors and controls the baking and packaging operations.

Projected savings for production monitoring indicate payback on the equipment in 15 months. Ummmm.

Data Entry Set as May Seminar Topic

SAN FRANCISCO — A three-day conference on data entry will be presented here by the American Institute of Industrial Engineers (AIIE) on May 15-17.

The seminar will cover the major changes and trends in data entry and data acquisition hardware, software and management, according to a spokesman. Distributed data entry and data entry personnel will also be discussed during the course of the meeting.

Speakers will include William G. Moore Jr. of Inforex, Inc., Donald Brosnan from MSI Data Corp. and Allan Lay of Pertec Computer Corp.

The course will also present case studies of successful applications. Concurrent workshops dealing with data entry will be held.

Reference material that will be distributed includes hardware surveys; vendor experience and product lines; an overview of application areas; case studies of successful applications; and procurement checklists and guidelines.

Registration fees are $295 for members of AIIE and $330 for nonmembers. Additional information and brochures are available from Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Kit Checks Air Pressure Of Self-Loading Tape Drive

ST. PAUL, Minn. — The 3M Co. has introduced a test kit that it said determines if insufficient air pressure is causing problems on self-loading tape drives.

Loading computer tape with self-threading tape drives is difficult or impossible if sufficient air pressure is not supplied by the drive to position the tape for threading, a spokesman explained.

The Loading Pressure Test Kit, which includes an air pressure gauge, a modified self-threading tape cartridge and a tape reel, will indicate the amount of air pressure present, he said.

The test reportedly takes less than a minute to perform, and one tester can be used on all of the drives in a DP center, the spokesman said.

The tester costs $100 from 3M at P.O. Box 33600, St. Paul, Minn. 55133.

The 3M Test Kit

Topaz Announces Regulator Line Now Available

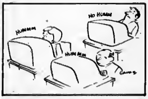
SAN DIEGO — Topaz Electronics has announced the availability of a series of ac line regulators designed to protect large DP systems from voltage fluctuations.

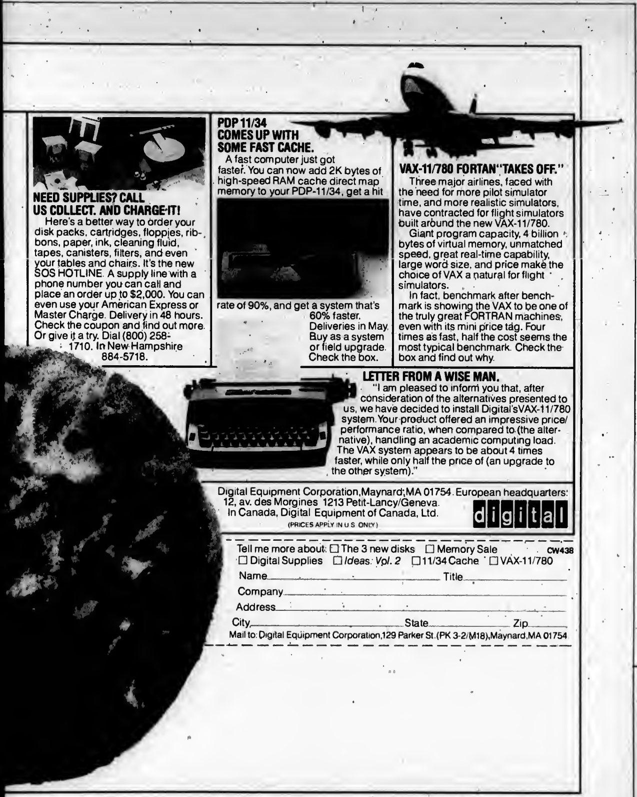
The three-phase regulators can accept input voltages varying ± 20% from nominal line voltage and regulate the voltage supplied to DP equipment to within ± 5%, the company said.

Protection against severe overvoltage is provided by an automatic shutoff within the units, a spokesman added.

The regulator, called the Model L-5, is equipped with a dual filtering system and is available in power ratings from 10 kVa to 100 kVa and 50Hz or 60 Hz operation.

Prices for the regulators start at $2,500 and range up to $18,000. Topaz is located at 3855 Ruffin Road, San Diego, Calif. 92123.

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PDP 11/34 COMES UP WITH SOME FAST CACHE.

A fast computer just got faster. You can now add 2K bytes of high-speed RAM cache direct map memory to your PDP-11/34, get a hit rate of 90%, and get a system that's 60% faster. Deliveries in May. Buy as a system or field upgrade. Check the box.

VAX-11/780 FORTAN "TAKES OFF."

Three major airlines, faced with the need for more pilot simulator time, and more realistic simulators, have contracted for flight simulators built around the new VAX-11/780.

Giant program capacity, 4 billion bytes of virtual memory, unmatched speed, great real-time capability, large word size, and price make the choice of VAX a natural for flight simulators.

In fact, benchmark after benchmark is showing the VAX to be one of the truly great FORTRAN machines, even with its mini price tag. Four times as fast, half the cost seems the most typical benchmark. Check the box and find out why.

LETTER FROM A WISE MAN.

"I am pleased to inform you that, after consideration of the alternatives presented to us, we have decided to install Digital's VAX-11/780 system. Your product offered an impressive price/performance ratio, when compared to (the alternative), handling an academic computing load. The VAX system appears to be about 4 times faster, while only half the price of (an upgrade to the other system)."

Digital Equipment Corporation, Maynard, MA 01754. European headquarters: 12, av. des Morgines 1213 Petit-Lancy/Geneva.
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Scanner Helps Railroad Handle Efficiency Tests

NEW YORK — Optical scanning is providing Long Island Rail Road (LIRR) management with an effective tool to better run the railroad, while meeting the Federal Railway Administration's (FRA) requirement for periodic testing of operating employees' performance.

When the FRA promulgated an administrative regulation early in 1975 with a provision that detailed test records be maintained, the LIRR was already doing it. An optical scanning, computer-based Transportation Efficiency Check System (Tecs) was in operation by January 1975, updating a long-established manual procedure and further enhancing safety on what is generally recognized as one of the nation's safest railroads.

"Too often, railroads are in the position of reacting to events and government regulations, but in this case we anticipated the requirement," James D. Sullivan, manager of transportation and engineering systems development, said. Sullivan, a career railroader, designed and implemented the system.

"The FRA's hearings on this regulation, which began in 1973, coincided with our own plans to modernize the manual procedures dating back many years for checking the performance of operating personnel. Tecs went into operation in January 1975," he said.

"Safety doesn't 'just happen' — you have to work at it," according to William J. Allen, assistant superintendent of train movement, whose department has primary responsibility for operating personnel checks.

Automatic Speed Controls

"In addition to the standard safety devices, all our passenger and freight trains are equipped with automatic speed controls that stop a train if the engineer fails to conform to signals on the line. But in the final analysis, safety is in the hands of our operating personnel — who are also the people with whom our customers come in contact every day — and this system is an important tool in helping run the railroad at top efficiency," Allen said.

The LIRR is the busiest passenger railroad in the U.S. and carries more than 67 million passengers annually. About 840 passenger and equipment trains are scheduled on weekdays, reportedly recording an on-time performance of more than 90%.

On the "firing line," actually moving this volume of traffic, are some 2,000 operating employees. The LIRR periodically tests these employees according to 61 efficiency checks. They range from fixed signal and speed control engineer checks through courtesy rule tests for trainmen. The checks are performed by trainmasters, road foremen and other authorized observers, with the goal of testing each operating employee at least once every six months.

"We were strict about making the checks, but the extensive clerical work involved in posting and maintaining records hampered the overall effort," Allen said. "We were not able to maintain an up-to-date historical file, and had great difficulty preparing reports that would tell us whether anyone had been missed. If effect, we had no 'product' to give a supervisor to help him in his work."

Optical Scanner on Hand

The problem was readily understood by Sullivan, who had spent 15 years in the Transportation Department before transferring to the Systems and Computer Services Department, where he became a computer specialist. The first thought was to develop a system using the optical scanner that was already on hand.

"We had installed an IBM 1287 optical character reader in 1969, and we're still using it with our IBM 360/22,"

(Continued on Page 54)

Fiche Reader Has Drop-In Lenses

HARTFORD, Wis. — A microfiche reader from Micro Design offers direct projection, a curved screen and drop-in lenses in multiple magnifications.

The Model 960 reader features a dual lens capability and modular design, according to a spokesman. The viewing screen of the unit is shaped to prevent keystoning or distortion resulting from an angled image, he added.

Available in three carrier sizes, the reader costs $229 from the company at 857 W. State St., Hartford, Wis. 53027.

Micro Design Model 960

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Data Processing Manager
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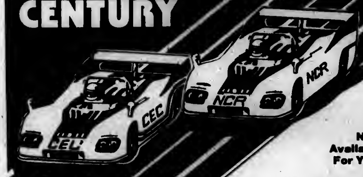

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EVENT™ business computer systems to begin with.

Railroad Operator Checks Aided by Scanning System

(Continued from 52)

Eugene V. Heissenbuttel, manager of systems and computer services, said. The scanner paid for itself in the original application, reading the holes punched by trainmen for tickets sold on trains. Some 300,000 such tickets are sold each month, and the 1287 eliminated what had been a big keypunching job.

"Since then, we have added other applications such as mail-on-ride documents sent in by commuters buying monthly tickets by mail, sick leave data and results of the annual physical inventory," he continued. "But there was still plenty of available machine time, so Tecs looked like a natural."

Most of the LIRR's DP work is performed at the Metropolitan Transportation Authority (MTA) centralized facility here. The Model 22 functions as a remote job entry system, transmitting work to the MTA's large-scale IBM 370s and receiving results for printout. An unusual feature is a control program that permits two jobs to run concurrently, so that as work moves back and forth to the MTA installation, the 1287 also performs its functions.

Converting to OCR Form

The major challenge for Sullivan and Allen, who worked in close collaboration, was to convert the check sheet for the 61 tests to an optical character recognition (OGR) form. Both agreed on the importance of maintaining the same test codes the observers were familiar with and making scoring as simple as possible since the tests are frequently performed on a moving train.

"It took some planning, and we were helped by IBM's OCR specialists, but by using both sides of the form we were able to get in all the information required," Sullivan said.

The reverse side contains a list of all tests and the score box on the front to which each relates. Scoring is done on the front portion. The observer follows nonscannable outlines in each box to record, in pencil, an "X" for failure or "0" for pass. Any number of tests covering the same individual can be entered on the same form.

In the case of a failure, the observer enters a 1 or an 8 to indicate action taken — caution, or a recommended investigation. In the latter case, the observer makes out a special report to inform management immediately.

The form also includes space for the name and employee number of the individual being checked, supervisor identification number and name and location codes. The forms are three-hole punched on the side, so they fit right into the timetable each observer carries. All operating employees are required to have their timetables with them at all times, and one of the checks performed is to ensure the timetable is up to date on all rules and regulations.

Report Production

Observers turn in their completed check forms, and every month approximately 600 accumulated forms are passed through the 1287. The pencil marks and numbers are "read" at high speed onto magnetic tape and then used to produce a series of reports.

One report lists, by department, any operating personnel not checked within the past six months. The LIRR commitment to the FRA is to check each such person at least once yearly, but for its own purposes prefers more frequent checks. This report immediately alerts supervisors to those people who must be checked.

Another report lists every test performed by an observer for the month, along with the tests themselves, pass/-fail grades, total employees tested and total tests performed. There is also a grand total for all activities. This report helps ensure that all tests are regularly performed, particularly the more important ones.

Failure Report

A third report details, by operating employee name, each failure along with the test code, date, mile-past location and any action taken. A summary shows all failures in each department and total number of failures for the month.

On demand, detailed reports can be produced by employee going back a full year, showing test dates, codes, passes and fails along with action taken. Repeated failures are highlighted and any necessary action can be taken immediately. Another report produced on demand lists every test code, and all pass/fails for a given period of time.

The error rate on test forms turned in averages about 10%, including mistakes in employee identification numbers and location codes. On the test scores themselves, the number of entries not "read" by the scanner is about 3%. The cards on which errors are made are returned to the observers for correction, and as more experience is gained in their use, the error rate is expected to drop.

"The important thing is that there's no way we can fail to know about an employee who should be checked, and we have detailed information it would have been impossible for us to develop manually," Allen said. "It would have required more than two people, full time, to even begin to met the FRA's requirements — and even then we wouldn't have had the extensive data on people and tests that we have now."

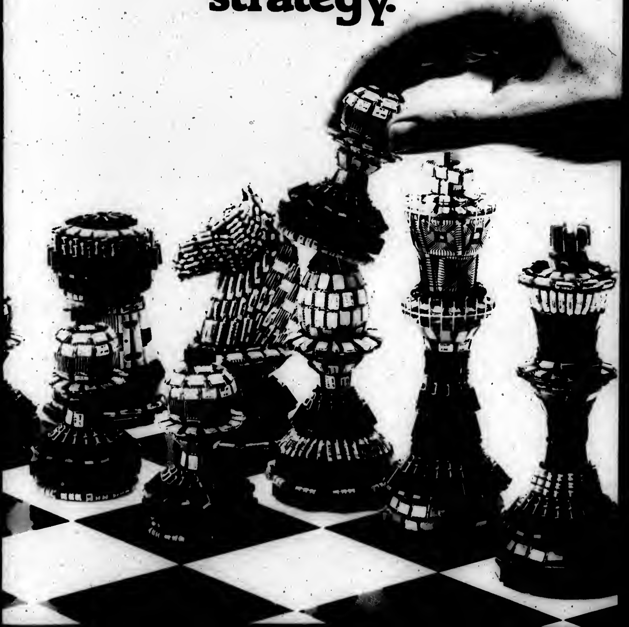
Binder Holds 1,200 Sheets

FRANKLIN PARK, Ill. — A fibreboard binder from Bankers Box/-Records Storage Systems accommodates burst or unburst 8.5-in. by 11-in. computer printout.

Using nylon posts and an adjustable compressor bar, the Datapak 604 accepts four inches or 1,200 sheets of printout, a spokesman stated. Once bound, the material is stored flat within the corrugated shell of the binder.

The binders are priced at $5.75 each in 12-unit cartons form the firm at 2607 N. 25th Ave., Franklin Park, Ill. 60131.

Honeywell Series 60: Everything you need for your long range strategy.



Honeywell Series 60: Steady advances on every front.

Series 60: A full family of computers, from minicomputers to large-scale systems. There are modular levels of hardware and software with lots of opportunity for growth within each level and easy transition from level to level.

Successive levels are linked by common Series 60 programming languages, compatible file formats and communications protocols. Levels 6 through 66 run under control of Honeywell's General Comprehensive Operating Supervisor (GCOS). Complete implementation at the upper end sets the overall standard. GCOS subsets provide large-system features and easy growth at lower levels and support interconnection of two or more Series 60 levels in communications networks. Level 68 operates under the Multics operating system.

Hardware and software technology includes metal-oxide semiconductor (MOS) memory, microprogramming, dual logic circuitry, automatic error detection and correction, and self-diagnosis. All levels are communication-oriented. Mini-based network processors (for all but smaller systems) yield high communications throughput, minimize overhead.

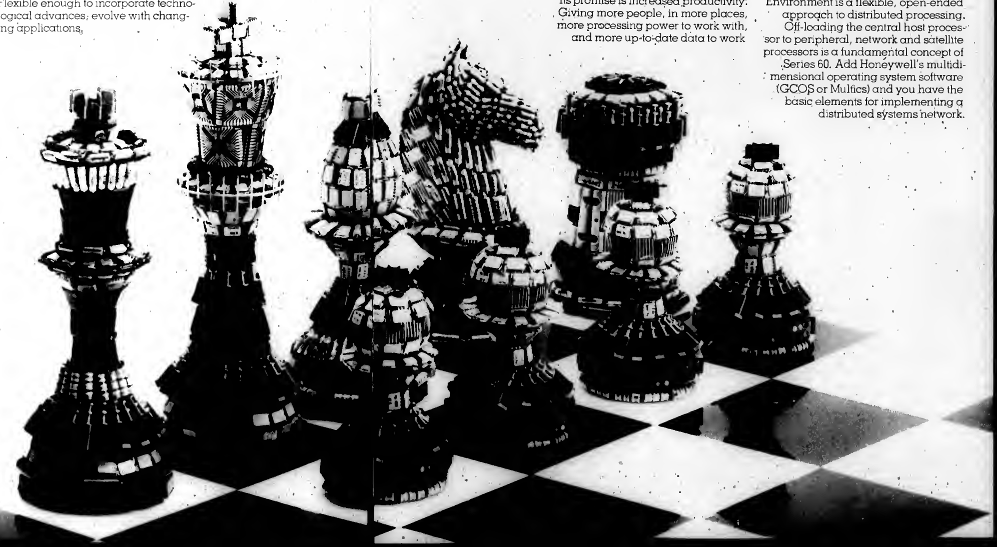
Data base management capabilities are emphasized throughout. The basis is Honeywell's Integrated Data Store II (I-D-S II) which embodies industry-standard data base specifications. Level 68 also has Multics Data Base Manager (MDBM) which includes a fully implemented relational data base system that offers unmatched functionality and ease of use. Special end-user facilities make access easier. Security provisions guard against unauthorized or accidental access.

Series 60—a unified family of easily expandable levels of processing power able to meet advanced requirements in online transaction processing, networking, distributed systems. Flexible enough to incorporate technological advances; evolve with changing applications.

Across-the-board power in the Distributed Systems Environment.

Decentralization of processing power and establishment of data bases on two or more separated but interacting processors. That's the essence of the Distributed Systems Environment. Its promise is increased productivity: Giving more people, in more places, more processing power to work with, and more up-to-date data to work from. But different people, different procedures, different policies, different philosophies, different organizations all require different approaches. Honeywell's Distributed Systems Environment is a flexible, open-ended approach to distributed processing.

Off-loading the central host processor to peripheral, network and satellite processors is a fundamental concept of Series 60. Add Honeywell's multidimensional operating system software (GCOS or Multics) and you have the basic elements for implementing a distributed systems network.



Level 68/DPS

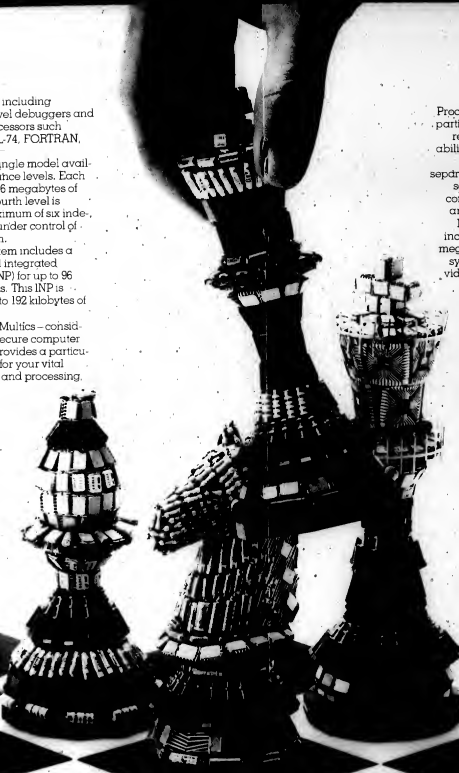
Level 68/DPS (Distributed Processing System): A combination of large-scale hardware, Multics software and firmware. Included is a powerful virtual memory capability designed specifically to answer user needs for increased productivity. The system operates simultaneously in many compatible modes – transaction processing, batch processing, time sharing, remote job entry, online inquiry, interactive graphics, and word processing – all with unrivalled system security and data integrity. Level 68/DPS provides comprehensive and easy-to-use facilities for sharing resources and coexisting in a distributed environment with computer systems of other manufacturers. The basic architecture is designed for online interactive processing and serves as an ideal vehicle for terminal driven applications.

It provides comprehensive tools for nearly everyone in a business organization. Simplified and uniform control language for all processing modes shortens the problem-solving cycle. A powerful end-user facility called Logical Inquiry and Update System (LINUS) is easy to use – by both technical and non-technical people. There are also powerful, efficient facilities for system and application software generation, including interactive source-level debuggers and online language processors such as PL/1; APL, COBOL-74, FORTRAN, RPG, and BASIC.

Level 68/DPS is a single model available in four performance levels. Each level supports up to 16 megabytes of main memory. The fourth level is expandable to a maximum of six independent processors under control of one operating system.

The base level system includes a minicomputer-based integrated network processor (INP) for up to 96 communications links. This INP is expandable from 64 to 192 kilobytes of main memory.

Level 68/DPS and Multics – considered to be the most secure computer system available – provides a particularly safe repository for your vital mainstream records and processing software.



Level 66/DPS

Level 66/DPS (Distributed Processing System): A large-scale unit particularly well-suited to applications requiring high-availability, expandability, and extensive communications.

The base level includes twin separately powered information processors in one cabinet, a single system control unit, input/output multiplexer, and one megabyte of MOS memory.

Main memory can be expanded in increments up to a maximum of eight megabytes. A single GCOS operating system controls both processors, provides multiprogramming and multidimensional capabilities, including simultaneous operation of transaction processing, batch processing, timesharing, remote job entry, and online inquiry modes. One or two companion processors may be added.

The base level 66/DPS system includes a minicomputer-based integrated network processor (INP) for up to 96 communications links. INP memory is expandable from 64 to 192 kilobytes. Software includes the General Remote Terminal Supervisor-II (GRTS-II) or the Network Processing Supervisor (NPS). Both support visual display keyboard and printer terminals, remote job entry devices, and satellite processors. NPS also handles message-switching applications.

Honeywell's versatile data management software, Data Management-IV (DM-IV), is fully supported, including a COBOL-74 language interface and a new batch-mode FORTRAN interface. DM-IV performs all management services for large data bases – data base creation, security control, and accessing for transaction, inquiry/response, or batch activity.

Level 66/DPS – versatile, expandable, reliable host processor performance for distributed system applications.

Level 64

Level 64: A medium-scale system that delivers the functionality of most large-scale systems—multidimensional growth, data communications, transaction orientation.

Integrated, microprogrammed mass storage, unit record, and magnetic tape processors off-load time-consuming peripheral control operations from the central processor. The unit record processor also handles data communications over as many as 42 links and supports a wide variety of local or remote terminals or connections to other systems.

Level 64 GCOS is a multi-programming, virtual memory operating system with automatic memory management. It includes extensive data protection, system integrity, and job accounting provisions. Key subsystems include Interactive Operations Facility (IOF), Transaction Driven System (TDS), and Integrated Data Store/II (I-D-S/II) data base system. It supports industry-standard programming languages RPG, COBOL and FORTRAN.

Versatility, ease-of-use, communications orientation, and reliability make Level 64 a sound investment for growth-oriented, distributed-systems-minded organizations.

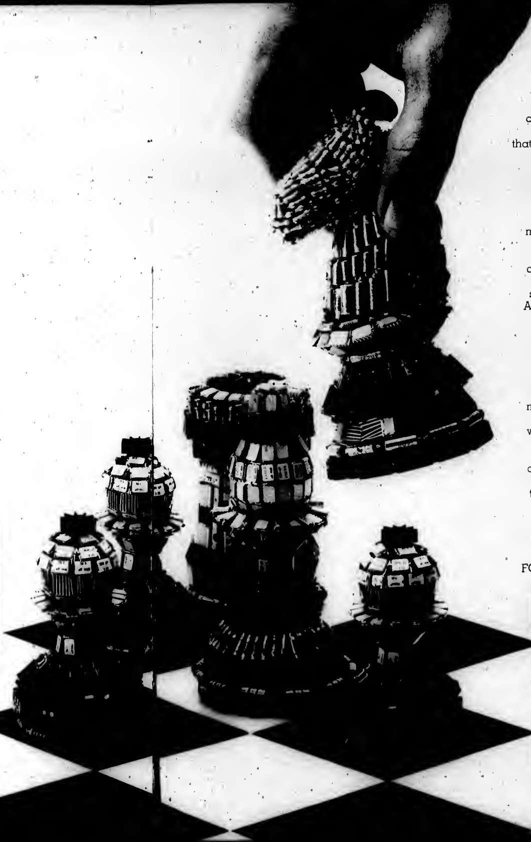
Level 62

Level 62: The small system with a built-in future. It keeps going strong where most small systems leave off. Through field upgrades, main memory is expandable from 48K to one million bytes. Basic systems performance can be easily expanded to a level more than twice as fast. Six I/O channels support up to six independent subsystems, including integrated data communications controllers for up to 25 links.

Level 62 GCOS simplifies operation and programming. It supports industry-standard RPG, COBOL, and FORTRAN and provides data management techniques for file management, retrieval.

It allows many jobs to be run concurrently, in both batch and transactional environments. It supports online data query and remote job entry from video display or hard-copy terminals. Data communication facilities support data collection from, or distribution to, remote sites and computer-to-computer transmissions.

Program and file conversion aides, such as Liberator/3 for System/3 computers, ease transition to Level 62 from other Honeywell or competitive systems.



Level 6

Level 6: Building-block minicomputer hardware and software with modular, open-ended architecture that's equally at home in an OEM, system builder, or end-user environment.

Level 6 systems provide throughput of up to 6 million bytes per second on a bi-directional asynchronous Megabus communications path. High performance semi-conductor memories are available in either 16K or 4K MOS chips providing up to 256K bytes per board. The newest models can accommodate up to 2 million bytes of main memory; all models can support billions of bytes of disk storage. A commercial model processes COBOL programs at high speed. Another model includes a high-performance cache memory and an integral memory management unit. A scientific instruction processor is optional.

The GCOS 6 operating system includes a wide variety of compatible modules that support applications such as forms data entry and remote batch with local processing, plus time-shared program development and terminal concentration. Other modules include compatible subsets of I-D-S/II data base management and TDS transaction systems. Level 6 provides direct support of Series 60 host processors through communications and compatible language file access and system applications subsets. High-level languages include industry standard COBOL and FORTRAN (incorporating reentrant code generation capability) as well as RPG.

Page Printing System.

The Honeywell Page Printing System utilizes an electrostatic process to set new standards for large-volume computer output printing. High-speed turnaround. Quality carbon-less impressions. Simultaneous forms printing. Conventional size pages. Printing, punching, perforating, collating – all in the same pass. A complete output production system that can save you time and money, increase output quality and productivity.

Honeywell's Page Printing System works with IBM, Burroughs, and Univac as well as Honeywell host computers. Three models deliver 8,000, 12,000 or 18,000 lines per minute. A single PPS installation can be cost effective at an output rate as low as 400,000 pages per month, can sustain a production rate as high as four million pages a month.

Applications Software

Extensive applications software is available for industries such as manufacturing, distribution, banking and health care, and for such activities as education, government, financial management, management science, mathematics, and engineering.

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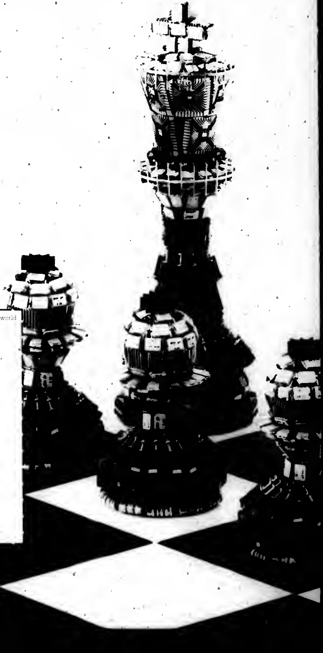

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Check!
Please send me more information about Honeywell Series 60; I am interested in the following:

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Level 68/DPS ☐ Level 66/DPS ☐ Level 64 ☐
Level 62 ☐ Level 6 ☐ Page Printing System ☐

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Four-Day Seminars to Cover Auditing Basics

NEW YORK — A four-day seminar dealing with the basic fundamentals and procedures of DP auditing will be held here May 30-June 2 by the American Management Associations (AMA).

Participants of "DP Auditing: Concepts and Techniques" will be shown how to develop a framework in which to conduct an audit, identify specific tasks to be performed and select various resources for performing audit functions, according to a spokesman.

How to obtain information through questionnaires and how to use analytic flowcharts and auditing software will also be discussed during the course of the meeting, he noted.

The seminar will detail how to minimize business interruptions caused by audit activities and detect and correct problems before they develop, AMA said.

Focus on IPF Auditing

The course will also focus on auditing the information processing facility (IPF). Attention will be concentrated on selected IPF control techniques and information-gathering tools used in this particular type of audit, the spokesman said.

Registrants will receive a copy of *Computer Control and Audit* by Mair, Davis and Wood, which is developed from field experience, and a notebook containing lecture outlines, program narratives and questionnaire flowcharts.

Workshop sessions will allow individuals to utilize classroom techniques in analyzing and working out actual case studies.

The course is geared toward newly appointed auditors, managers and officials who are responsible for the standards, security and control within the DP environment. It will be repeated in Chicago on Aug. 28-31, Boston on Sept. 11-14, New York on Oct. 2-5 and San Francisco on Dec. 11-14.

Registration fees, including the cost of meeting materials, are $550 for AMA members and $630 for nonmembers. Team discounts are also available for three or more people from the same firm at $470 for AMA members and $535 for nonmembers.

AMA is located at 135 W. 50th St., New York, N.Y. 10020.

Power Node Built to Cut Need for Custom Wiring

SANTA ANA, Calif. — The Computer Power Center from Emergency Power Engineering, Inc. can help lessen the need for custom wiring done by electrical contractors, according to the company.

The unit is hard-wired to the building in which it is located and serves as a central node for power distribution to the equipment in the computer room, according to a spokesman.

No Electricians Later

Electricians or electrical contractors are not required later if additional equipment is to be added or existing equipment moved; instead, nontechnical personnel can plug power cables into the unit, he noted.

"The Computer Power Center generally pays for itself 100% the first time the computer is moved to a new location," the spokesman claimed.

Several features have been incorporated, the company said, to provide ease of use: easy accessibility to cables, lighted push-button switches, status indicators and the ability to attach up to 126 single-phase or 42 three-phase lines.

Other Advantages

Other advantages of the unit include a single-point electrical ground and the isolation of the computer equipment from spurious and potentially disruptive signals in the building's wiring, the firm added.

The Power Center, which does not incorporate a voltage regulator, can handle output voltages of 120- to 240 Vac and input voltages from 208- to 600 Vac.

Prices range from $6,000 to $14,500, the vendor said from 2919 S. Halladay, Santa Ana, Calif. 92705.

Verification Cuts Record Errors

(Continued from Page 50)

Another benefit from this system is the competitive spirit of the workers involved. "We use a dynamic allocation system here, and each morning the clerks are given their individual piles to process. Each one knows just how he rates in the department and strives even harder to increase productivity," Crandall noted.

He added that another benefit for the company is the decreased employee turnover in the dairy department.

The Provo firm handles records on nearly 640,000 cows, about 65% of the company's business, Crandall noted. The rest of its business is with savings and loan associations and medical records facilities.

Tilton is a free-lance writer based in American Fork, Utah.

NCC. Computerworld's got it covered—as only a newsweekly can.

This year's National Computer Conference promises to be the biggest ever. More than 40,000 people are expected to visit the record-breaking 1400 booths in the main show; and thousands more will be attending the newly-expanded *Personal Computing Festival* — including exhibits, speakers, and technical sessions on this fast-growing area of the computer world. And, of course, *Computerworld* will also be at NCC — to hail it, unveil it, and wrap it up — in three informative, important issues full of NCC news.

May 29th—Preview Issue: A complete rundown of the companies, products and services, keynote speakers and technical sessions you'll see at NCC. Plus — a guide of things to see and places to go in the Anaheim area. This issue will help you make the most of your time at NCC. (If you forget to bring your copy of *Computerworld* you can pick one up free at our booth — while they last.)

June 5th—Show Issue: Our Show Issue will include all the late breaking stories, program changes, intended product announcements and behind-the-scenes show details leading up to NCC. (It will also be available at our NCC booth.)

June 12th—Wrap-up Issue: Cohesive analysis and summary of the significant events of the '78 NCC. This issue will give details on product announcements and will review the content of program sessions, experts' observations and keynote speeches. The important events of NCC will be summarized here.

If you're a manufacturer or marketer in the computer field, don't miss these ad closing dates for *Computerworld's* NCC issues:

Preview Issue: (May 29th)—Color and Insert close: May 12; black & white close: May 19.

Show Issue: (June 5th)—Color close: May 19; black & white close: May 26.

Wrap-Up Issue (June 12th)—Color close: May 26; b&w close: June 2.

For all the details contact your *Computerworld* salesman. He can give you special assistance in NCC ad planning. Or call Terry Williams at (617) 965-5800 to reserve space for your ads.

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Until now, either you opted for the capability of a mainframe or you went with the flexibility and economy of a mini. Until now.

Introducing the Data General ECLIPSE M/600 computer system. It combines the workload capability of a mainframe with the traditional advantages of a mini, such as interactive computing, distributed processing and economy.

One thing that makes the ECLIPSE M/600 like no other existing computer is an incomparable three level I/O Management System, which prohibits I/O bottlenecks. Another is an incredibly efficient Demand-Paged Memory Management, which allows you to run more jobs faster. And its new Job Processor is unmatched for speed and flexibility. Then our supremely intelligent Advanced Operating System (AOS) keeps everything speeding along for a minimal terminal response time and a maximum concurrent batch stream throughput.

Once again Data General raises the world's expectations for computers, while lowering the cost. To find out more about what you can expect from the new ECLIPSE M/600, write for our brochure. Or call (617) 366-8911, Ext. 4735.

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Canadian User Cites Page Printer's Advantages

(Continuied from Page 49)

budget, this is a significant savings. The 12-inch width handles the 132-position print line when using 12-pitch characters, thus providing an automatic compatibility with AGT's impact printers.

When the burst, trim and stack function of the 3800 is selected, the form trims down to 11- by 8.5 inches, which brings computer output in line with most other business documents.

On-Line Forms Printing

Although many of our requirements for special preprinted forms can be met using the flexibility of the character set to create horizontal and vertical lines or logos, for example, there will always be a requirement for forms with some manner of preprinted design.The 3800 meets this requirement using a photographic technique known as the forms overlay feature.

Using this feature, a frame containing a photographic negative is mounted in the machine and, if activated by the job control statements, a synchronized light flash will imprint an image of the form on the photoconductive drum prior to the character-generating laser scan.

This method of "on-line" forms creation is cheap, easy to change and permits most graphical techniques such as transfer lettering, half tones and screening. A major exception is color printing.

AGT evaluated several methods of producing the negative needed when using the overlay feature for on-line forms printing. Some of our forms designs require fairly precise line placement, especially on vertical lines through adjacent 12- or 15-pitch characters, and this led us to investigate the use of a computer graphics system at a service bureau operated by Computrex.

Using a forms layout chart annotated with distances between lines and alphanumeric headings, the design is input through a Tektronix, Inc. 4014 storage tube. The system adds standard set-up markings needed for mounting the negative and outputs the form design on a California Computer Products, Inc. Model 936 plotter. The speed of plotting means that several variations can be tried in one session for evaluation by the user.

When a design is validated, the plot is rerun on a dimensionally stable Mylar medium. After manual application of any transfer lettering design that has been specified, a contact print is made from the Mylar master to produce a negative on .007-inch film.

The negative is framed and, after testing, labeled with the set-up coordinates. These are preset by the 3800 operator prior to printing the job output that needs the forms overlay feature.

The attractions of using this technique for forms overlay design, aside from gaining the precision needed to match tne 3800 printing capabilities, include good turnaround compared with manual drafting, ease of revision during the design phases and the creation of an easily amended library of forms designs.

An additional benefit resulting from the use of a computer graphics system for the design of overlays will be a degree of standardization and, therefore, further economies in the area of special forms.

System Performance

A major challenge presented by the 3800 is making good use of its throughput capability. Paper is fed at a constant rate of 32 in./sec and AGT's own measurements, which include some interruptions, show that an average rate of 1,000 forms every six minutes is possible.

The line/min rating thus depends on the line density: at 12 line/in.; the average rate is equivalent to 15,000 line/-min. The theoretical maximum is over 20,000 line/min but this takes no account of interruptions.

Whatever speed is achieved, it remains obvious that we have increased our potential for adding to the weight of paper output, which is already a problem for many computer centers.

However, some applications show a very high payoff. For example, AGT spent a great deal on reducing and copying essential construction program reports. Now, they can be printed by the 3800 in the right size and quantity and with each copy individually addressed, ready for distribution.

Applications like this give a directly computable savings. Of course, a number of problems have to be solved before turning the computer room into a print shop, and one of these is rethinking the distribution system to keep the bottleneck the 3800 has resolved from moving downstream.

Incidentally, the capacity of the 3800 has allowed AGT to reduce our impact printer configuration from six units to four, and we plan a reduction to three soon. We have also absorbed growth that would have necessitated a seventh printer had we stayed with impact technology.

It is going to take AGT some time to fully exploit the capabilities of existing impactless intelligent printer technology. Systems designers are unfamiliar with the concept of "free-type" printers; this means that projects that were previously not even considered for the comptuer are now feasible.

Hornby is a planning assistant with the Systems and Methods Department of AGT, which installed one of Canada's first IBM 3800s in November 1977.

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Mini Bits

GRC Desktop System Compatible With PDP-11

HARTFORD, Wis. — General Robotics Corp. (GRC) has introduced a desktop computer system that incorporates a microprocessor compatible with the Digital Equipment Corp. PDP-11 plus a 62K-byte random access memory, extended instruction set and floating-point arithmetic, the company said.

Based on a DEC LSI-11,the 35-kilogram Model MTV/X3 system also incorporates an eight-quad slot backplane, 12-line by 40 column plasma display, keyboard with numeric pad, triple minifloppy disk unit that accommodates more than 1M byte and a 60 char./sec printer.

A standard MTV/X3 configuration also includes a DEC RT-11 operating system license and 15 minidiskettes, he noted.

An MTV/X3 costs $12,000 and discounts for $7,150 when purchased in quantities of 100 with an RT-11 monitor license.

GRC is at 57 N. Main St., Hartford, Wis. 53027.

Centronics Matrix Printers Gain Front-Feed Option

HUDSON, N.H. — A front-feed option for Centronics Data Computer Corp.'s 700 series of dot matrix printers permits automatic front insertion of cut forms and cut multipart form sets, according to company spokesmen.

Designed for invoicing, accounting, banking, stock certificate preparation and other applications requiring single or multiple-copy documents, the device operates with Centronics' 80-column Model 780 and 781 printers, which use the narrow front feed that accommodates paper 4.2 in. to 8.5 in. wide, the firm said.

The front-feed option also reportedly operates with Centronics' 132-column model 700, 701, 702 and 703 printers and with the Model 761 keyboard send/receive and receive-only teleprinters which use the wide front feed that accommodates paper 5.2 in. to 11.7 in. wide, the company added.

In end-user quantities, the stepper-motor-driven and microprocessor-controlled option costs $700 from Centronics at Hudson, N.H. 03051.

SBS Publishing Plans Seminars

SAN JOSE, Calif. — SBS Publishing, Inc. will soon begin conducting two series of seminars, one dealing with the distributed processing problems faced by DP managers and the other covering small business computer marketing.

"Distributed Processing — Today and Tommorrow," the first seminar series, will take place May 15 in Chicago, May 18 in New York City and June 8 in Anaheim, Calif.

Speakers at the one-day event will include L. Duane Kirkpatrick, vice-president of Dean Witter Reynolds; John Dodd, DP manager of Wilson Sporting Goods Co.; and Larry Woods, manager of distributed processing at Deere Co. Problems these speakers will examine will include data security, communications protocols and organizational and support consideration.

The other seminar, slated for June 7 in Anaheim, will be geared to senior marketing executives at firms that now or soon will compete in the small business computer market.

SBS Publishing is located at 4320 Stevens Creek Blvd., Suite 190, San Jose, Calif. 95129.

GA Dual-Function System Eases Generation of Forms

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — Software packages that reportedly simplify forms generation and allow users of corporate distributed DP systems to enter and process data simultaneously highlight a minicomputer-based networking system introduced recently by General Automation, Inc.

Comparable in performance to the Datapoint Corp. 6600 and the Inforex, Inc. 7000, the 220 DPS distributed processing system provides an "English-like" forms generation package that allows users to create screen formats without subsequent recompilation, a spokesman claimed.

With the Easyform package, users can generate CRT-displayed data entry forms like inventory control documents and bills of lading in as little as an hour, compared with weeks or even months with rival forms generation software, he said.

The 220 DPS system also comes with a Comprehensive Data Entry Software (CDES) package that, in addition to assisting input, performs batch computations in both Cobol and Fortran, he added.

The spokesman credited the 220 DPS' ability to serve both as a processor and as a data entry system to the CDES package and to the system's 128K-byte semiconductor main memory, which accesses in 400 nsec. He also attributed the dual-function capability to the system's operating system and to its Isam/Psam file management system, both of which are identical to those in GA's larger and more powerful 440 DS multiterminal systems.

These two common features, plus a Cobol/Fortran computing capability, make the 220 DPS upward-compatible with the 440 DS systems, he explained.

Intended primarily for Fortune 1,000 firms and OEMs that buy hardware in large quantities, the latest GA distributed processing product is said to suit applications like order entry, inventory control, reservations management, general accounting, payroll, personnel information preparation and many other standard business functions.

Typical Configuration

A typical configuration incorporates a 16-bit GA-16/220 LSI minicomputer with a 10M-byte disk drive unit and a 200 line/min printer. Each CPU/cluster processor reportedly supports up to four CRT terminals that operate as far as 2,000 feet away from the CPU in a multitasking environment.

By contrast, the 440 DS system, of which the 220 DPS is a "scaled-down version," accommodates as many as 16 concurrently operating CRT terminals, a 160M-byte disk unit and a 600 line/min printer.

An IBM 2780 emulation capability allows the 220 DPS sysems to communicate bisynchronously at 2,400 bit/sec with most common models of remote host mainframes, the spokesman noted.

A configuration with four operator stations, cluster processor and software package costs $20,000 in OEM quantities. First deliveries of the systems will begin June 1 from GA at 1055 S. East St., Anaheim, Calif. 92803.

Small Business System Propels Airline Security Firm's Reports

DALLAS — Management reports that routinely went into a holding pattern 18 months ago are now arriving safely and on schedule at an airline security services firm here, thanks in part to the company's recently installed small business system.

Guardian Services, Inc., a subsidiary of Braniff International Airways, uses the minicomputer-based system to prepare payroll, invoices, payment records and monthly financial reports for its offices here and in Kansas City, Houston, Oklahoma City and Amarillo, Texas.

Before automating its report preparation, Guardian relied on an acounting firm to manage its financial books, according to Vice-President Robert R. Kendall. Although that method of generating documents produced accurate results, it often forced the security services firm to wait a month or more for the information needed to make executive decisions.

"In an industry that moves over 500 miles per hour, that just wasn't fast enough," Kendall recalled.

Like most firms, Guardian bases its planning and management decisions on financial

(Continued on Page 68)

Jan Howe, who had never run a computer before, took the job as Guardian Service's small business system operator because "I thought it would be fun."

ACDS Packages CDC Printer For Use With PDP-11 Line

NASHVILLE, Tenn. — Advanced Computer Data Systems, Inc. (ACDS) is reportedly offering the Control Data Corp. 300 line/min printer in a package for end users and OEMs of the Digital Equipment Corp. PDP-11.

The package includes an interface/controller card and a software driver to run under DEC's RT-11 or RSX-11M operating systems, ACDS said. The printer itself features an RS-232 interface with a 1K buffer, paper basket, selectable forms length and 6- and 8 line/in. LED diagnostics, a spokesman added.

Options include 48-, 96- or 128-character sets with corresponding increases and decreases in printing speeds that are adjustable by changing print bands, ACDS said. The package also comes with an optional compressed font that permits 15 char./in instead of the usual 10-char./in. capability.

Because of this optional compressed font, the package allows the printer to generate a 132-character-wide report on 11-in.-wide paper, the company explained.

The package and the compressed font option cost $9,900 and $400, respectively, from ACDS at 210 25th Ave. North, Nashville, Tenn. 37203.

Airline Security Firm Gets Management Reports Faster

(Continued from Page 67)

reports, the vice-president noted. Without timely information, the company couldn't initiate programs or procedures until two months after a problem had arisen.

These chronic delays and the resulting search for an alternative accounting system eventually led Kendall to consider equipping his firm with an in-house small business system.

"It was the only logical choice," he explained. "If we wanted full control over our financial reports and documents, we had to have the ability to process them ourselves — without adding staff. We had seen minicomputers in operation at other companies and were impressed at how much was available for such a small cost."

After determining that a minicomputer would solve his company's problem, Kendall began searching for the right combination of hardware and software that would meet Guardian's requirements.

The search for a suitable system took the firm six months. First, company officials defined parameters that included an on-line general ledger system with accounts payable, receivables, payroll, financial reports and management reports, Kendall said. They also specified electronic storage of all employee files for quick reference whenever needed.

System Selected

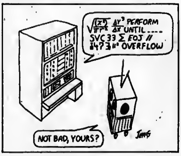
By the end of 1976, Guardian Services selected a Wang Laboratories WCS-30 with 10M bytes of hard disk storage, 16K bytes of internal memory and a high-speed printer. A program to meet the firm's exact requirements was developed by Fiestel and Fiestel here, Kendall said.

Because programs had to be developed and many years of financial and personnel information converted, the Guardian Services computer didn't become fully operable until last March. In the meantime, Jan Howe was hired as a computer operator.

"I had run a word processor before, but never a computer," Howe said. "I thought it would be fun and it's one of the reasons I took the job. The programmers showed me what to do, and I ran our March statements."

Careful and a little nervous, Howe admitted she took two days to do what should have taken only a few hours. "But we got it right the first time, and we got out our March statements two weeks before our accountants had finished with February," she added.

In the near future, Guardian plans to expand the existing configuration to accommodate additional applications and capabilities such as budget comparisons, programs to ease contract bidding and a telecommunications link to remote terminals.



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At Six Australian Hospitals

Patient Report System Relieves Clerical Burden

VICTORIA, Australia — Clerical workloads and the volume of paper records have declined noticeably at six area hospitals since officials at the institutions jointly developed what they claim is the first patient identification and report system of its type in the world.

Designed for both in-patient and out-patient care, the minicomputer-based system has allowed the laboratory staffs at the participating hospitals to concentrate on their primary jobs — doing lab work — instead of wasting their time on relatively trivial chores like manually transcribing experimental results. As a result, the system has yielded improved quality control procedures at the six hospitals, spokesmen for the institutions said.

"The system has enabled us to cope with a worklaod during an expansion period, and this would not have been possible using the old manual system," one official said.

Updated Patient Reports

Based on a program written by the Hospitals Computer Service of nearby Monash University, the system's Data General Corp. Nova 3 processor receives raw data from six CRT terminals in the hospitals' laboratory or patient reception areas. After storing, updating and processing the results of laboratory tests, the 64K-byte minicomputer generates cumulative patient reports as well as ward reports that show the latest test results for patients in each ward at any time of the day or night, spokesmen explained.

For example, at Dandenong and District Hospital, one of the latest institutions to subscribe to the system, the processor produces cumulative reports that cover the biochemical and hematological history of each patient. Using a paper tape reader, the system also reads measurements from many test instruments directly into the minicomputer, hospital officials said.

Eventually, officials at the participating hospitals hope to expand the existing configuration into a "total laboratory system," capable of supplying microbiological and histopathological data as well as the other forms of clinical data already available from the system, they added.

Copes With Expansion

The six cooperating hospitals developed the system, which also incorporates a 2M-byte disk subsystem and a magnetic tape subsystem, partly to increase control over expanded treatment facilities and to keep pace with growing public demand for improved service.

One of the hospitals, for example, boosted its bed capacity this year from 205 to 340 beds, with the opening of a new wing, and a recent survey showed the institution provides services to 203,000 persons in five suburbs southeast of Melbourne. By 1982, the hospital expects to serve 300,000 patients, officials reported.

To keep pace with this increased demand, the hospital plans to install two additional terminals during the next 18 months — one in its medical records department and the other in the intensive care ward. The hospital has already linked its pathology department to the patient identification and reporting system, spokesmen said.

Other hospitals that have also connected their pathology departments to the system include Royal Melbourne, Prince Henry's, Alfred, Geelong and St. Vincent's.

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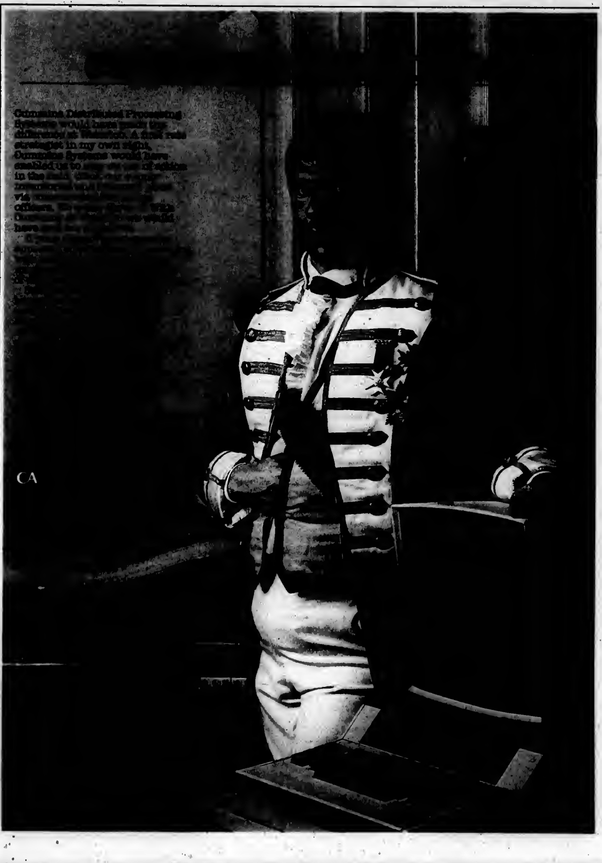

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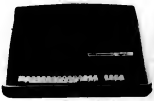

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In-House CPU Cures Hospital's Cash Flow

TWO RIVERS, Wis. — The 73-bed general hospital here has been using an Industry Application Program (IAP) and a System/32 from IBM since 1975 in order to speed its cash flow and increase the accuracy of its patient charge recording.

"It became clear in 1975, after Two Rivers Hospital separated from municipal control and became a nonprofit community corporation, that we needed something better to replace what had become a fragmented business system," according to controller A.T. McKinney.

"We had an ancient accounting machine for patient billings, we used one outside firm for general ledger posting and we used another for payroll processing. As a result, our procedures were slow, cumbersome and costly," McKinney said.

Patients on the Increase

"At the same time, we faced growing patient loads both in the general hospital and in our associated 86-bed extended care facility, Hamilton Memorial Home," he continued.

"The System/32, together with IBM's Hospital Financial Management System IAP, offered a ready solution to our problem," McKinney said. "The small computer is simple enough to be operated by our regular staff people and economical enough to be well within our means.

"Yet it also offers the computing power to enable us to pull together all of our business functions in a single system and the data storage capability to support a central information source.

"The financial management IAP designed to run on the System/32 gives us ready-to-use programs for patient billing, accounts receivable, payroll, accounts payable and general ledger so that we need not bring in our own programmers," McKinney reported.

First Application

Patient billing was the first application program implemented on the system. "This is where the inefficiency of the old system had been most painful," McKinney noted. "We were having trouble tracking patient charges, especially those emanating in the laboratory, pharmacy or X-ray departments. Billings were delayed, slowing down our vital cash flow, and bill statements often confused the recipients.

"Even more troublesome was our inability to put our hands on needed patient information — individually or collectively, in detail or summary form," the controller said.

With the System/32, patient transaction data is captured at its source, from admittance to discharge, and the individual patient records are updated daily.

Cash Flow Speeded

Room charges are generated automatically, and any ancillary charges accruing to the patient are automatically priced and posted. Patient bills are triggered on a cycle basis. Two Rivers Hospital has modified the basic program here so the computer provides a bill itemizing the patient charges and summarizing the charges by type of service.

"The dynamic and overall efficiency of patient billing has speeded our cash flow from receivables by an average of one week, which represents some $70,000 in available funds," McKinney reported.

"The ability of the system to accurately track and record all charges against a patient account has resulted in a 6% annual increase in our ancillary service billing total, and this represents an extra $240,000 in annual revenue," he said.

Important By-Product

"As a by-product of the patient billing routine, the computer delivers detail and summary reports showing service frequency and revenue amounts by service type and department for inpatients and outpatients. In addition, we can quickly retrieve meaningful information on patient mix and services performed and on trends and rates, giving us much better control over our present and future financial positions," McKinney said.

Officials said training employees on the computer has presented no problem, and six employees are now capable of taking over the computer operation if the need arises.

Currently, two additional applications — inventory and utilization review — are being considered for the system, which is readily expandable, the officials said.

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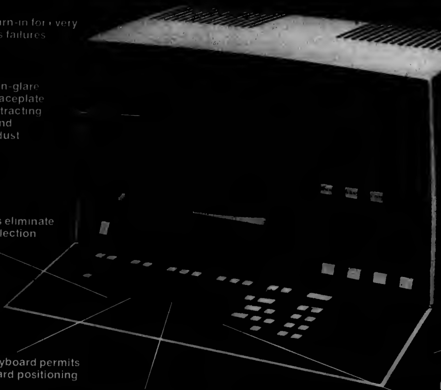

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Expandable Mini Series Handles POS, Standard Business Tasks

MOUNTAIN VIEW, Calif. — A series of expandable minicomputer systems from Extensys Corp. performs retail store and supermarket point-of-sale applications as well as standard business functions such as general ledger accounting, inventory and product control and sales order entry, according to the firm.

Equipped with a distributed processing capability and multitasking software, the modular EX3000 incorporates a host processor and as many as 16 subsidiary processors that control one or more floppy disk, hard disk or remote terminal subsystems, an Extensys spokesman said. Each of these subsystems reportedly accommodates up to eight 9,600 bit/sec serial lines to permit communications with as many as 64 remote terminals.

Four Subsystems

A basic EX3000 series incorporates four subsystems, a spokesman said.

- A floppy diskette unit with a 1M- to 4M-byte mass storage capacity.
- A 96M-byte hard disk subsystem.
- A multiple terminal subsystem with eight RS-232C serial interfaces.
- A terminal/operator processor subsystem with keyboard, CRT and RS-232C serial interface.

Other boards in the family include a memory board with a 16K- to 64K-byte random-access memory (RAM); a memory management board that controls a RAM as large as 1M byte and has a priority direct memory access (DMA) mechanism; and an 8085-based CPU with a 16K-byte onboard programmable read-only memory, eight-level vectored interrupt and combination interval/event counters, the spokesman noted.

A typical EX3000/System 30, for example, is said to consist of a combination system console/terminal, three remote terminals, 24M-byte hard disk unit, 200 char./sec matrix printer, operating and higher level software and 192K-byte system and user RAM with DMA memory management module. Processing is distributed throughout 19 microprocessors, Extensys added.

System Software

System software is the company's Extensys Multiprocessor Operating System (Emos), which provides all file handling capabilities and program development tools, according to the firm.

Higher level languages accommodated by the series reportedly include Extended Basic, Cobol and Ansi Fortran IV.

Prices for the series range from $10,800 to $148,550. Extensys is located at 380 Bernardo Ave., Mountain View, Calif. 94040.

"You Mean, CPU Doesn't Stand for Coffee Processing Unit?"

IBM Series/1 Users Get Interface Option

ORANGE, Calif. — A serial interface from MDB Systems, Inc. reportedly allows users to attach a teletypewriter or similar peripheral to the IBM Series/1 and to use an input unit RS-232 capability.

The MBI-49-TTY/ RS-232 interface also transmits and receives data serially by using TTL Levels, MDB spokesmen said.

In RS-232 or TTL operation, the interface offers clear-to-send and request-to-send protocol, the spokesmen added. It also provides an 8-bit character buffer that allows an attached processor a complete character time to fetch an assembled character before data overrun occurs, they said.

The MDB IBM Series/1 TTY-board reportedly has switch-selectable data transmission rates ranging from 110 bit/sec to 9,600 bit/sec and operates under direct program control. Standard units also come with switch-selectable parity, number of stop bits and word length, MDB said.

Deliveries of the $560 board will begin in June from MDB at 1995 N. Batavia St., Orange, Calif. 92665.

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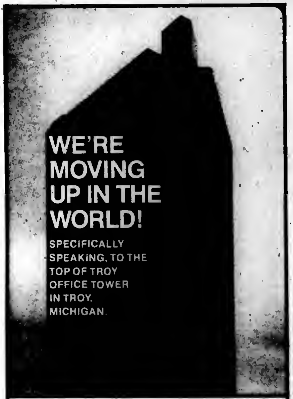
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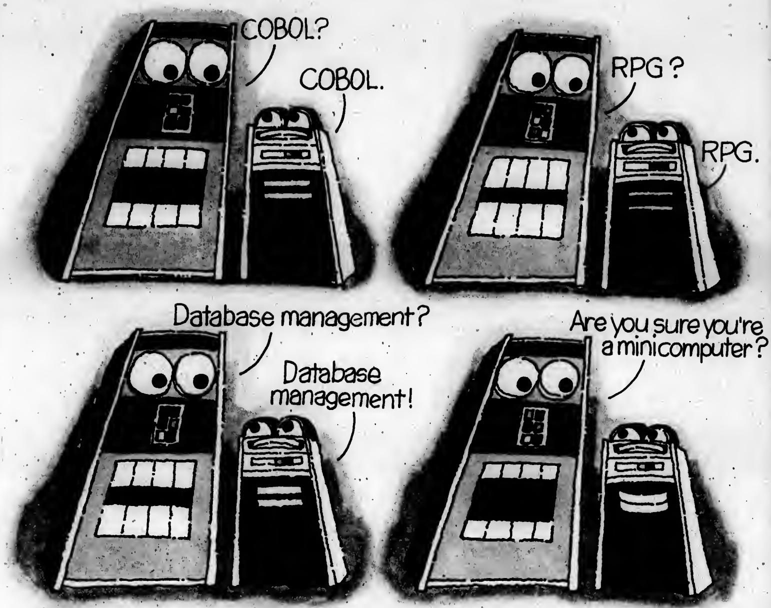
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digital

Diva Disk Fits PDP-11/70

EATONTOWN, N.J. — Diva, Inc. has introduced a disk system compatible with the Digital Equipment Corp. PDP-11/70 that communicates with the PDP-11/70's cache bus controller, a spokesman for the disk manufacturer said.

Functionally equivalent to DEC's RP04 and RP06 disk drives, the DD 70 series uses its cache bus interface to transfer 32-bit words into CPU memory without Unibus intervention, Diva said.

The DD 70 series reportedly consists of the Computroller V, which is a microprocessor-based disk controller; a four-board PDP-11/70 interface that plugs into the DEC CPU and replaces DEC's RH70 massbus controller; and various disk drives ranging in capacity from 80M- to 300M byte/spindle.

Some systems in the series transfer data 50% faster than the DEC counterparts, the Diva spokesman claimed.

A microprocessor based emulation package makes the DD 70 software transparent to all standard DEC operating systems and thus eliminates foreign I/O drivers and software or hardware modifications of a user's PDP-11/70, the spokesman added.

Depending on storage capacity, prices for single-drive systems range from $22,000 to $30,000. Add-on drives range in cost from $10,000 to $21,000.

Diva is at 607 Industrial Way West, Eatontown, N.J. 07724.

Odell Desktop Unit Operates Alone or in a Network

MOUNTAIN VIEW, Calif. — Odell Industries Corp. has begun production shipments of a desktop computer system that the company claimed performs assorted commercial, industrial and engineering applications either as a stand-alone unit or as part of a larger network.

Equipped to serve word processing and DP applications, the System 85 incorporates a programmable keyboard, built-in 1,920-char. display, dual floppy disk drives, communications interface and random-access memory as large as 64K bytes in a self-contained package, Odell said.

Odell System 85

The system's CPU reportedly incorporates an Intel Corp. 8085 microprocessor and a compatible multibus structure that allows users to upgrade to a 16-bit processor with minimal modification.

The System 85 accommodates the Shugart Associates line of floppy disk storage units and can be specified by users to incorporate either an 80,000-char. mini diskette or a 200,000-char. standard-sized diskette, according to a spokesman.

The system can accept two to four single- or dual-headed diskette units, he added.

The System 85 communicates in asynchronous, bisynchronous or synchronous modes at programmable rates ranging from 50 bit/sec to 19.2 kbit/sec in a polled, interrupt, dial-up or on-line environment, the firm said.

Intel PL/M-compatible, the system comes with assorted software packages including an advanced Commercial Basic, Ansi Standard Fortran, assembler, text editor, general ledger and letter writer, the spokesman noted.

Prices for the System 85 start at $8,350 with OEM discounts available. Odell Industries is at 2351 Charleston Road, Mountain View, Calif. 94043.

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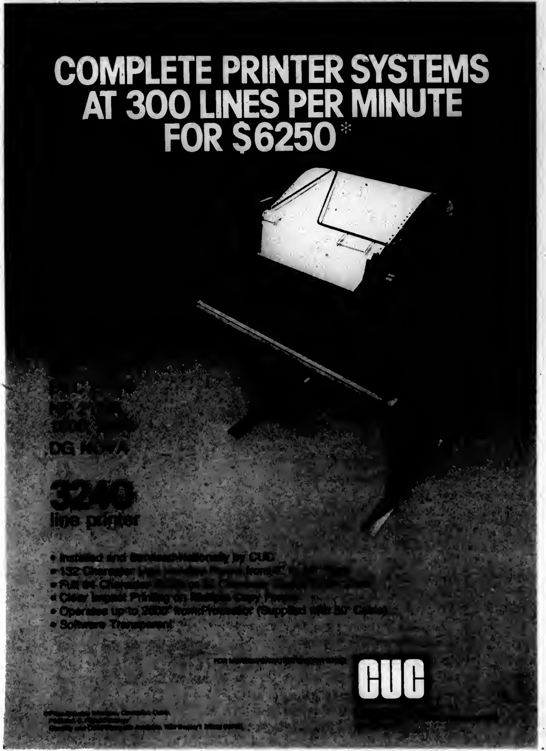
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Four Elements Make Up Minimal System

MANUFACTURER AND TYPE	PRICE	CPU TYPE	TOTAL MEMORY (ROM/RAM)	POWER SUPPLY (AMPS)	FRONT PANEL SWITCHES	INTERFACES: VIDEO	TAPE	PARITY	OTHER	VIDEO DISPLAY KEYBOARD	SOFTWARE INCLUDED	GRAPHICS OR PLOTTING?	KIT
Commodore PET *	$595	6502	14K/4K	?	No	Yes	Yes	No	IEEE 488	Yes Yes	Basic, Monitor, Diagnostic	Yes	No
Cromeco Z-2	$595	Z80	0/0	30	No	No	No	No		No No	None	No	Yes
Digital Group Z80	$1,095	Z80	256/10K	12	No	Yes	Yes	Yes		No No	Monitor, Diagnostic, Demonstration	No	Yes
Heath H-8	$375	8080	?/0	?	Yes	No	No	No		No No	Basic, Assembler, Editor	No	Yes
Heath H-11	$1,295	DEC LSI-11	4K (18-bit word) RAM	?	No	No	No	No		No No	Basic, Focal, Assm. Ed.	No	Yes
Imsai 8080	$699	8080	0/0	28	Yes	No	No	No		No No	None	No	Yes
OSI • Challenger II-P	$598	6502	8K/4K	?	No	Yes	Yes	No		No Yes	Basic	Yes	No
Polymorphic Poly-88	$575	8080	3K/512	6	No	Yes	No	Yes		No No	Monitor	Yes	Yes
Radio Shack TRS-80*	$599.95	Z80	4K/4K	?	No	Yes	Yes	No		Yes Yes	Basic	Yes	No
SWTPC 6800	$395	6800	?/4K	?	No	No	No	No	RS-232	No No	None	No	Yes

* Complete system — plug it in and run
** Requires a video monitor or a modulator and TV set only

Figure 1

By William L. Colsher
Special to CW

One of the greatest effects of microprocessor technology and large-scale integration (LSI) technology has been the enormous price reductions of products that make use of those technologies.

Since vendors of microcomputing equipment have chosen to package their respective microprocessor and LSI components in different arrangements, there is quite a bit of difference between "minimal" systems and their costs. Some of the primary interest areas for users considering a "minimal" system should include the basic system, buses, output devices, storage devices and input devices.

A hobbyist in the market for a system must decide, first of all, around which microcomputer he wants to build that system. This is perhaps the most difficult part of the whole process, given the large number of different systems currently available.

After this decision is made, however, the rest of the system can usually be built simply by looking for the best prices for a given type of component. In some cases, the decision is even simpler. For example, the most commonly used tape cassette interface, the Tarbell Interface, is available only from Tarbell Electronics.

Bus structure is a rather emotional topic. I will only say, therefore, that the "problem" is not nearly as large as many would make it seem. All the important peripherals are rapidly becoming available for all the major systems and interfaces are also being marketed to enable two different bus structures to communicate with each other.

Figure 1 shows some of the major micros currently available, their list prices and the accessories included in the price. The type of microprocessor chip and other information are also included for comparison purposes.

Users should note that, in many cases, the basic micro does not provide a complete system by any means. In the case, for example, of most of the Altair bus systems (also known as the S-100 bus), only a microprocessor unit (MPU) and front panel are pro-

(Continued on Page 76)

MANUFACTURER	MEMORY SIZE: 8K (Static)	16K (Static)	16K (Dynamic)	32K (Static)	32K (Dynamic)
* Cybercom	199.95	525.00	—	—	—
*** Digital Group	225.00	445.00	375.00	845.00	695.00
* Dynabyte	—	555.00	399.00	995.00	—
* Extensys	—	—	595.00	—	895.00
* Godbout	139.00	—	—	—	—
* Seals Electric	229.00	579.00	395.00	—	750.00
** Smoke Signal	—	529.00	—	—	—

* Altair/Imsai bus only
** SWTPC 6800 bus only
*** Digital Group bus only

Figure 2

MANUFACTURER	CASSETTE TAPE INTERFACE	PARALLEL I/O INTERFACE	Serial I/O***: Cost	Ports***	Type	VIDEO INT.	INTEGRATED SERIAL AND PARALLEL INTERFACE
Cybercom	—	—	—	—	—	149.95	$149.95
Digital Group	$145.00* **	4 port ($65.00)*	$95.00	1	Either	* **	—
Imsai	—	4 port ($299.00)	$156.00	2	Either	—	—
Mits	$138.00	1 port ($105.00)	$148.00	1	?	—	—
Processor Tech	$110.00	—	—	—	—	$199.00	$149.00
SWTPC	$79.50	1 port ($35.00)	$35.00*	1	Either	$175.00	—

* Included with system MPU price
** Integrated cassette tape and TV interface (one board)
*** Serial interfaces are either RS-232 (many video terminals, Decwriter, etc.) or 20mA current loop (Teletype)

Figure 3

'Minimal' System Varies According to Vendor

(Continued from Page 75)

vided. This is also true of several other micros.

In virtually all cases, some additional purchases will be needed to obtain a microcomputer system capable of being programmed in some high-level language. It is this last capability that we will use as the major factor in determining the additional circuitry and peripheral devices needed to build a minimal system.

Main Memory

Main memory enjoys perhaps the greatest range of prices and the most rapid price decreases of any component in a microcomputer system. For this reason, the prices in Figure 2 should be considered as guidelines only.

The amount of main memory required depends upon the type of programming a given user plans to do. Most of the Basic interpreters available today require 4K to 12K bytes of memory, so about 8K to 16K bytes of memory in total are required for a user who wants to use a higher level language.

The word "total" is used because in several cases the Basic interpreter or other system software is supplied in read-only memory (ROM) of one type or other. Thus, in addition to space for the interpreter, at least 4K bytes of memory are needed for user programs.

In many cases, user programs are stored in only slightly compressed form. The more memory available, therefore, the more lengthy the programs that can be written. At the present time, the average amount of memory in use among hobbyists seems to be about 16K bytes.

All of the prices listed in this article were accurate at the beginning of the year. Some fluctuations may have occurred since then.

Terminal Trauma

Few microcomputer hobbyists own hard-copy printers or terminals. The reason is simple: cost. Even a Teletype costs as much as all the rest of an average system combined and high-quality devices such as the IBM 2741 and similar terminals are far beyond the average person's price range.

There are a few surplus units available, but these are sometimes difficult to interface and maintain.

The way around this cost problem has been solved rather ingeniously: a low-cost keyboard (ranging in price from about $65 to $250) is interfaced to the system as the primary input device and a video interface card provides a video signal that can be directly input to a video monitor or through a low-cost ($7 to $25) modulator to an ordinary television set.

Figure 3 shows what these interfaces cost from some of the major manufacturers. Generally, a parallel interface card for the keyboard and a video interface are the minimum I/O configuration for personal use.

In addition, some means for loading and saving programs and data is also required. As in the case of replacing traditional output devices, the mass storage devices commonly used in traditional DP have been replaced with low-cost alternatives.

The most common device is an ordinary cassette tape recorder connected to the microcomputer system by means of a special interface. These interfaces operate rather slowly, in the range of 300- to 1,500 bit/sec, but this is quite adequate for low-volume applications.

These interfaces record the data on tape in a large number of different formats; at the present time, there is no standard format and there appears to be little hope for one in the near future. Even in the case where the identical standard is used for recording, say, a Basic program, that program may be unreadable by any other version of Basic. Figure 3 contains some representative prices for these interfaces.

Disk Storage

Lately, the minifloppy disk has begun to gain considerable favor in the hobbyist market. Disk technology of any kind has obvious advantages over tape but; even though prices are rapidly dropping, these devices are rather costly in comparison with the cost of the rest of a system.

One of the seldom mentioned advantages of disk storage is that the recording techniques and formats are already fairly standard. Thus, only software changes may be needed to read disks written by a different mainframe, as is the case with magnetic tape on large-scale systems today.

Another interesting device that is becoming rather popular is high-speed tape. These tape drives are somewhat less expensive than floppy disks and are comparable to the minifloppy with well-designed software.

Figure 4 shows some typical prices for both mini- and standard floppies as well as high-speed tape drives.

Total Cost

What is the total cost of a typical hobby or personal computer system? Figure 5 summarizes the various parts of such a system and their cost from a number of manufacturers. In all cases, the criteria for the selection of the various accessories is the ability to execute programs in some high-level language such as Basic.

Thus, an MPU 8K to 16K bytes of memory, some sort of terminal consisting of a keyboard and display and an external storage device to save programs and data are the minimum system that is acceptable.

This discussion of a minimal system is not to be taken as definitive of the personal computer market in any way. It merely serves to provide a starting point for understanding exactly what a personal computer is and what it costs.

The best possible course for anyone who wants to know more is to visit local computer stores, read the many magazines which cover the field and actually use some of the systems. This — not mere academic knowledge — will lead to a reasonable choice for a personal computer.

MANUFACTURER	HIGH-SPEED DUAL-CASETTE DRIVE	MINI FLOPPY		FULL-SIZE FLOPPY		Notes
		Single	Dual	Single	Dual	
Cromemco	—	$495.00	—	—	—	3,4
Digital Group	$545.00	$795.00	$1,195.00	$995.00	$1,575.00	3
Info 2000	—	—	—	—	$2,650.00	
Micropolis	—	$795.00	—	—	—	3
North Star	—	$699.00	$1,099.00	—	—	2,3
Peripheral Vision	$585.00	—	—	$750.00	—	1,2,3
Smoke Signal	—	$795.00	$1,139.00	—	—	
Vista	—	$649.00	$1,048.00	—	—	1,2,3

1 — Cabinet extra
2 — Power supply extra
3 — Kit form
4 — Controller extra

Figure 4

MANUFACTURER AND MAINFRAME (PRICE)	MEMORY (PRICE)	CASSETTE INTERFACE COST	VIDEO INTERFACE COST	I/O INTERFACE KEYBOARD	KEYBOARD*	MONITOR (TV) *	TAPE UNIT *	TOTAL ****
Digital Group Z80 ($1,295.00)	18K (Included)	Included	Included	Included	$100.00	$150.00	$50.00	$1,595.00
Imsai 8080 ($699.00)	16K ($278.00)	$110.00	$149.00	$105.00	$100.00	$150.00	$50.00	$1,641.00
SWTPC 6800 ($395.00)	20K Total ($529.00)	$79.50	$175.00	Included	$100.00	$150.00	$50.00	$1,478.00
Radio Shack ** TRS-80 ($595.95)	16K total ($290.00)	Included	Included	Included	Included	Included	Included	$889.95 ***

* Estimate — prices and quality depend on user needs
** Assembled system
*** Software included
**** Users should expect to spend $50 to $100 more for software.

Figure 5

Micro Bytes

4K, 8K RAMs Work With 80/10 Offerings

SAN DIEGO — Electronic Solutions, Inc. is offering 4K and 8K random-access memory (RAM) boards that it said are compatible with Intel Corp.'s SBC 80/10 and National Semiconductor Corp.'s BLC 80/10 microcomputers.

Memory cycle time is 630 nsec and typical power consumption on an 8K board is 9.5W, the firm said. Address selection is performed by jumpers.

The 4K RAM board costs $295 and the 8K is priced at $395. Electronic Solutions is at 7969 Engineer Road, San Diego, Calif. 92111.

University Plans Workshop

PITTSBURGH — The Carnegie-Mellon University here will sponsor a five-day microcomputer workshop beginning June 5 on the university campus.

The course will include more than 12 hours of "hands-on" problem-solving experience, a spokesman noted. The format will emphasize opportunities to review and discuss sample problems and their alternative solutions with the faculty and other class members.

Additional information on the workshop is available from Gerry Cohen at Post College Professional Education, Carnegie Institute of Technology, Carnegie-Mellon University, Schenley Park, Pittsburgh, Pa. 15213.

IEEE Announces Schedule

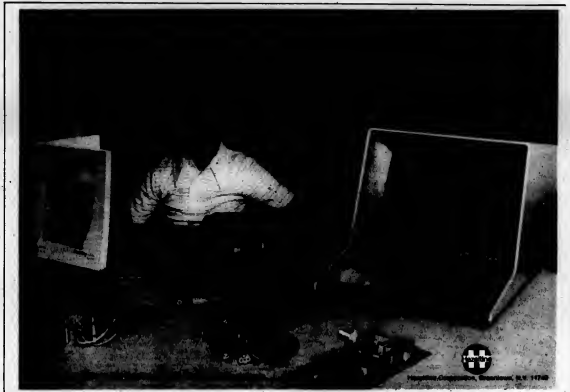
NEW YORK — The Electrical Activities Board of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) has announced a group of courses and seminars for its spring/summer sessions.

Three-day microprocessor courses will be held April 20-22 in Birmingham, Ala.; May 18-20 in Princeton, N.J.; May 25-27, Burlington, Vt.; June 8-10, Princeton (spillover); June 15-17, Chicago; June 22-24, Washington, D.C.; and June 28-30, Montgomery, W.Va.

Two-day microprocessor seminars will be held May 5-6 in Kansas City; May 19-20 in Dallas; and July 20-21, Nashville, Tenn.

A one-day introduction to microprocessors will be held in Milwaukee May 12, followed the next day by a course in minicomputers and microcomputers in the same city.

Additional information on the courses can be obtained by contacting V.J. Giardina, 445 Hoes Lane, Piscataway, N.J. 08854.



Q

QUEUE — Refers to waiting lines resulting from temporary delays in providing service.

R

RACK — Refers generally to the metal or other type of frame or chassis on which panels of electrical, electronic or other equipment may be mounted, such as power supply units, amplifiers, etc.

RAM (RANDOM-ACCESS MEMORY) — This type of memory is random because it provides access to any store location point in the memory immediately by means of vertical and horizontal coordinates. Information may be "written" or "read" out in the same very fast procedure.

READER — Refers to a device capable of sensing information stored in an off-line memory media (cards, paper tape, magnetic tape) and generating equivalent information in an on-line memory device (register, memory locations)

REAL-TIME CLOCK — Refers to a device that provides interrupts at twice the alternating current line frequency. For example, it allows maintenance of an accurate time of day clock and measurement of elapsed time.

REGISTER — 1. A digital computer device capable of retaining information, often that contained in a small subset (e.g., one word) of the aggregate information. 2. A temporary storage device used for one or more words to facilitate arithmetical, logical or transferral operation. Examples are the accumulator, index, instruction and other registers. The accessibility to the CPU is basic to registers. The number of registers in a microprocessor is one of the prime criteria for judging its worth. 3. A memory device capable of containing one or more computer bits or words. A register has zero memory latency time and negligible memory access time.

RESET — 1. To restore a storage device to a prescribed state. 2. To place a binary cell in the initial, or zero state. 3. To return a register or storage location to zero or to specified initial condition.

RESTORE — 1. Refers to return of cycle index, a variable address or other computer word to its initial value. See also "reset." 2. Periodic regeneration of charge, especially in volatile, condenser-action storage systems.

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Modems Plus
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Curtis 1000
Spectron
K&K Associates
Applied Digital Data
Epic Data
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Applied Data Communications
Data Forms Company
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Rianda Electronics
Computer Corp of America
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General Electric
Qume
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DataMedia
Texas Instruments
Consolidated Computer
Cybersearch

Here's the schedule:

ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

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Charting Different Courses

Service Firms Launch Mini Offerings . . .

By E. Drake Lundell Jr.
CW Staff

Even though Automatic Data Processing, Inc. (ADP), Keydata Corp. and National CSS, Inc. (NCSS) are reacting to the same threat with the development of their new systems over the past month, each has taken a different path.

While the ADP Onsite systems, the Keydata Unity series and the NCSS 3200 line all share some characteristics, the vendors are pursuing considerably different marketing paths.

Each of the service firms is offering a minicomputer, but that is just about the only major point they have in common except that the offerings were all aimed at combating the traditional minicomputer and small business systems manufacturers who have been making inroads into the traditional service areas of the business.

The ADP offering, for example, most closely resembles a traditional service offering and will be marketed as such, while the Keydata Unity series makes a break with the traditional methods of serving its market. The NCSS 3200 series departs most radically from tradition.

ADP's Onsite is truly a service offering. The hardware will not be sold for standalone applications, but rather as part of an overall service including communications with and processing on the ADP central sites.

Users will only be able to buy a complete package from ADP, and that package includes the mini as only one part of the service. All software for the system runs on the host network, which is necessary for the system to function.

Because Onsite is a service offering, ADP indicated it would continue to market the service in the traditional way — to the ultimate end user of the service rather than to the DP department. However, the firm admitted the DP department would probably be more involved in the decision making on the Onsite service than has traditionally been the case when end users contracted directly for computer service time.

But while ADP's approach involves a complete service package, the other two firms have branched out more.

Keydata and NCSS will both offer standalone minisystems that can be optionally hooked to their networks and central computer sites.

But there is a different emphasis by the two firms, with Keydata stressing applications for the first-time user, while NCSS offers a slightly more experienced system that should appeal more to technically sophisticated users.

Like a service offering in many ways, the Keydata Unity system will provide tailoring of applications packages to the individual user's needs and will provide a lot of "handholding" support for the user in order to get him up and running.

Also in both the case of ADP and Keydata, the firms have opted for hardware that has been proven from well-known mini makers — Data General Corp. Novas in the case of Keydata and slightly modified Digital Equipment Corp. Decsystem 2020s in the case of ADP.

The NCSS difference in approach begins here. The firm contracted with a little-known manufacturer — Two Pi Corp. — to build a processor specifically designed to run a subset of the firm's VPCSS operating system that has been in use on the NCSS network for a decade.

The system provides a complete IBM compatibility and can run programs developed for IBM 360s or 370s. In fact, the systems may be used as 360/370 replacements or supplements, although the firm played down that part of the marketplace for its initial thrust.

But NCSS is not stressing applications so much as Keydata and instead is emphasizing the capabilities of its sophisticated operating system, a feature that is sure to appeal to the more technically sophisticated.

. . . In Reaction to Incursions By Minis and Small Systems

By E. Drake Lundell Jr.
CW Staff

In the past four weeks, major service firms in the computer industry have launched a counteroffensive against the growing encroachments of small business computer makers into the traditional service areas of the business.

Automatic Data Processing, Inc. (ADP) started the movement with the announcement of its Onsite computer systems [CW, March 27], but was quickly followed by Keydata Corp. with its Unity series of processors [CW, April 10] and this week by National CSS, Inc. (NCSS) with its 3200 series of processors.

The firms don't chose to call the moves "defensive" of their traditional markets, however. For example, Josh Weston, ADP president, said he had "never played defense" in his life, but admitted that the best defense was a good offense.

An NCSS spokesman admitted that the announcement was a "bit of offense and a bit of defense," while the people at Keydata emphasized they felt they were filling a market need not presently filled by the mini makers.

Minicomputer firms have been installing systems at first-time users' locations and in departments of larger corporations that needed extra power over and above what would be supplied by the central DP site. Both of these markets had been the preserve of the service firms.

Industry sources said that while it is difficult to measure the amount of business the mini makers have been able to gain at the expense of the service firms, the impact has been relatively slight so far.

However, the threat has been building because the price of producing hardware has consistently been coming down. And while mini makers gained extra resources to devote to software, they were also driven to offer more software in order to keep their growth rates up.

But the declining price of hardware also worked to the advantage of the service firms. It is relatively easy and inexpensive today to purchase minicomputer hardware, all three firms stressed when entering the business.

The availability of inexpensive hardware allows each of the service firms to add a great deal of value — in the form of software and support — to each system they ship.

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ADL Predicts
Telecommunications Sales to Double by 1987

AMSTERDAM, The Netherlands — The world market for telecommunications equipment will more than double by 1987, resulting in total sales of $65 billion (in 1977 dollars) as compared with 1977 sales of $30 billion, according to forecasts made by Arthur D. Little, Inc. (ADL) recently at the firm's international telecommunications forum.

The private systems market, mostly in the U.S., Japan and Europe, will grow the fastest, predicted at 10.1% annually, the research firm said.

However, the switching, transmitting and local distribution segments, although growing at a slower annual rate, will each account for about a third of the total dollar sales.

ADL predicted the transmission and local distribution segments — comprising radio, cable and satelllite sytsems — will achieve an 8.1% annual growth as developing regions expand international and intercity trunks and major cities extend their local distribution systems.

Market Potential

Developing nations represent the greatest market potential with an expected annual growth rate of nearly 10% annually over the next decade, compared with the 6.2% growth rate for North America, the firm said.

Because of expanding world markets, the North American share of the telecommunications equipment market is predicted to drop from the present 47% to 40% by 1987.

Digital switching technology, largely a result of computer development, will allow less sophisticated countries to bypass old-fashioned technologies in building communications capabilities.

But economic conditions and teledensity (the ratio of telecommunications equipment per unit of population) will be the major constraints on growth in the less developed nations.

Prospects for Financing

Prospects for financing, while continuing to be rosy in the U.S., will require emerging nations to seek the assistance of international lending agencies, ADL added.

Developed areas where equipment is already installed also offer large revenue opportunities as more sophisticated users transform their current telephone networks and increase usage of facsimile and other special-purpose terminals.

In addition, ADL expects increased equipment sales to boost the market for related services such as research and development, installation and maintenance.

Prospects for new entrants into the telecommunications equipment market are encouraging because of regulatory changes and the growth of new technology. However, the industry is highly concentrated. ADL noted that 13 companies had sales in excess of $500 million each in 1976.

Major firms have been able to improve margins along with sales growth while keeping price increases below those for other consumer expenditures.

Other topics covered at the conference included future applications in the areas of teleconferencing and telediagnosing, expected to be available by the turn of the century.

In light of the growing world wide exchange of data, privacy matters are also of great concern as individual privacy standards and national security practices vary from country to country.

Expansions

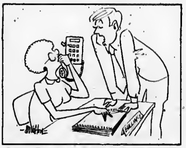
Chicago Data Systems, Inc. has moved into expanded facilties at Suite 150, 2805 Butterfield Road, Oak Brook, Ill. 60521.

CMI Corp. has begun operations from its new international headquarters at Top of Troy at W. Big Beaver and I-75, Troy, Mich. The company markets, trades, sells and leases IBM computers and peripherals.

Wango Division of Perkin-Elmer Corp.'s Data Systems Group plans to consolidate company operations. Groundbreaking ceremonies for a new 168,000 sq-ft facility have taken place on a 44-acre site in Garden Grove, Calif.

The Kennedy Co. of Altadena, Calif. has leased a 33,000 sq ft manufacturing facility in Azusa, Calif., located at 717 N. Coney Ave., the building will house the newly formed Disk Division and the Engineering Department, which will move from Atlanta.

Computer Automation, Inc. of Irvine, Calif., is proceeding with plans to establish a manufacturing operation in the European Economic Community in Dublin, Ireland. Computer Automation Ireland, Ltd. will be established as the resident operating company with headquarters at Coolock.



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Commerce Reports

DP Boosts '77 Business Machines Trade Balance

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The U.S. computer industry's "strong competitive position in world markets" was wholly responsible for the 29% rise the U.S. balance of trade in business machines experienced in 1977, according to the Department of Commerce.

A new trade balance record of $2.3 billion was set in business machines trade in favor of the U.S. The balance was a positive $1.8 billion in 1976, Commerce said.

Exports for 1977 were 23% above those for 1976, and imports increased by 16%. Both exports and imports of the calculating and accounting machines subgroup declined for the third year in a row.

The largest U.S. customer continued to be the European Economic Community (EEC), whose members took 46% of the export total. Canada, the leading individual country purchaser, bought 16% and Japan, 8%.

The Far East remained the largest U.S. supplier, providing 48% of total U.S. imports in 1977, Commerce stated. Japan, which sent $501 million in business machines to the U.S., continued to be the largst single U.S. supplier, holding 35% of the total business machines imports to this country.

Exports of computers and related euipment rose 26% from $2.6 billion in 1976 to nearly $3.3 billion in 1977. Imports rose 8% from $234.7 million in 1976 to $252.9 million in 1977, the Commerce Department reported.

In 1977, the EEC bought approximately $1.5 billion in computer equipment from the U.S. Canada purchased $475.4 million, and the Far East bought $413.6 million.

Commerce stated that the EEC sold $102.5 million in computers and related equipment to the U.S. in 1977. Canada sent $77.3 million worth of computers across our northern border last year, and the U.S. purchased $63.1 million in computers from the Far East.

More detailed data can be obtained from the U.S. Census Bureau publications "FT-410 U.S. exports, Schedule B Commodity by Country" and "FT-246 U.S. Imports for Consumption and General Imports."

Foreign Orders & Installations

International Commodities Clearing House Ltd. of London has ordered more than $280,000 in data communications equipment from Racal-Milgo, Inc.

Regie Nationale Des Usines Renault, a French automobile manufacturer, has ordered three SEL 32/75 superminicomputers from Systems Engineering Laboratories SA. The firm will use the systems for design applications and the control of machine tools in three of its Paris area plants.

The Swedish National Communicatons Administration has ordered a Univac 1100/80 from Saab Univac. It will be used to link another 2,500,000 telephone customers to a planned nationwide system.

Spigadoro, a food products company headquartered in Bastia Umbra, Italy, has ordered a Univac 90/30 to be used for order entry and inventory control.

The Dutch government has ordered Phillips PTS6000 terminal systems for a project at the Land Ownership Registry and for an automated fine-payment system at the Public Prosecutor's Offices.

Timpsons, a shoe manufacturing company of Manchester, UK, has ordered a Univac 90/30 to upgrade its merchandising, stock control and fashion selection functions.

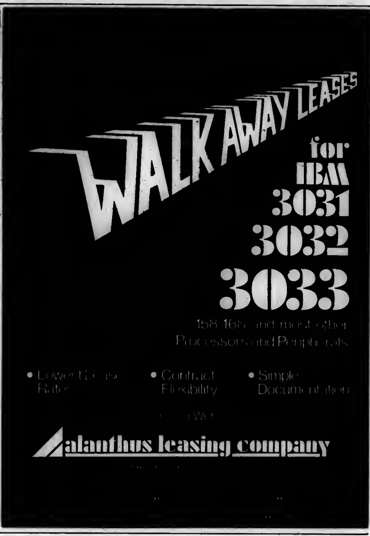
The Norwegian Telephone and Telegraph Co. has ordered a Univac 1100/82 system valued at more than $4 million from Saab Univac Norge A/S to improve customer service.

Barclays Bank International Ltd. of London has ordered a Nonstop 16 Computing System from Tandem Computers, Inc.

A distributed network of 14 Micos computer systems has been installed at group oil terminals of Shell Oil UK by Mini-Computer Systems, UK, Ltd., a subsidiary of Mini-Computer Systems, Inc., Elmsford, N.Y.

The Societe Generale Bank of Nigeria has installed two NCR Corp. 1-8250 systems, six NCR 299 accounting systems and four NCR 7200 data entry subsystems.

Ross Foods Ltd., a UK Imperial Foods Group company, has ordered a Honeywell Information Systems, Inc. Level 6 minicomputer, valued at about $250,000, for use as an automatic weight-checking system.



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Company Secures Mountains of Data in Iron

By Tim Scannell
CW Staff

HUDSON, N.Y. — Users can find literally ironclad security for their data at the Iron Mountain Security Storage Corp. here and at its sister facility, the Iron Mountain at Rosendale Records Center, Inc. (Imar).

Data security and integrity are two major concerns of the DP professional, particularly in the light of the recent increase in the number of bombings, embezzlements, human errors and incidents of civil unrest, according to Paul Catalano, marketing vice-president for the firm.

Iron Mountain, established in 1951, is actually an 80,000 sq-ft building that occupies about two-thirds of an abandoned iron ore mine. The building has about 13 stories, 10 of them below ground, and at some points is covered by more than 200 feet of solid rock, a spokesman said.

Upon entering the building and identifying himself, a prospective client must pass through two steel doors and an iron gate to enter a series of offices. The security precuations, up to this point, are similar to those of most manufacturing or industrial companies. This, however, is where the similarities end.

The actual storage area, a series of underground corridors that follow the contours of the mountain, is protected by a 28-ton time-lock vault door described as being the largest in the U.S. Beyond that is a door protected by a "curtain of air" that acts as a shield between the air within the vaulted corridors and that in the exterior offices, the spokesman continued.

Lining each corridor on both sides are randomly numbered, 400-lb steel doors that open into private vaults, varying in size from 400 cu ft to 45,000 cu ft. It is within these temperature- and humidity-controlled vaults that clients store their backup tapes, microfiche and related documents, the spokesman noted.

Various other items stored by clients include television pilot and series tapes, movie film master prints, unreleased recordings of numerous singers and assorted objets d'art.

Active Center

Although most corporations think of the Iron Mountain facility strictly in terms of storage, it is very much an "active" center, according to Richard Ruck, assistant vice-president. Files are maintained in accordance with a prearranged system used at the facility or in accordance with the customer's own particular specifications, Ruck stated. Clients can access information at Iron Mountain and update records as often as required, he added.

A great deal of the misunderstanding and confusion concerning the present purpose and capabilities of the Iron Mountain complex has evolved from its historical background, according to Ira Temchin, assistant sales vice-president. The structure was originally conceived to protect the data and information of major corporations in the event of an atomic attack. In fact, the installation's former name was the Iron Mountain Atomic Storage Corp.

Since the mine itself contains magnetic iron ore, the heat from an atomic blast would serve to fuse the elements in the mountain, making it considerably more secure, Temchin stated. The complex also has a backup diesel power supply as well as reserve food stocks for use by personnel in the event of an emergency.

The second facility, at Rosendale, was founded in 1966 and is contained within a 15-acre cavern formed as a result of mining limestone for a nearby cement factory. Presently, only four acres of the cavern are being used, and the area being used consists of paved access streets lined with two-story buildings. Each climate-controlled building along the streets houses the records and data of a specific company.

When the Imar facility was first put into operation, people from the surrounding communities were quick to form their own opinions concerning its purpose. Neighbors suspected the center of being everything from a Central Intelligence Agency headquarters to a secret government missile base, Temchin said. They were finally given a special tour to relieve their suspicions, and many of them are now employed by the facility.

Two buildings in the center are of special interst. One is the Retrieval and Information Security Center (Risc) and the other is a hotel-like structure maintained by a major oil corporation.

The Risc center is actually an alternate computer site complete with raised flooring, telecommunications and environmental controls — everything except DP equipment. In the event a corporate member of the Imar family should suffer a disaster at its own data center, that company would be fully recovered and operational in the Risc Center not more than five days after the destruction occurred, Catalano said.

The center also helps corporations develop, test and implement realistic disaster recovery programs to prevent extensive destruction in the future, Catalano added.

Magnetic tape rehabilitation and preservation is another function of the Risc facility, Catalano noted. Tapes are processed through a scheduled quality control and maintenance program that includes cleaning, retensioning and testing each reel.

Catalano said the benefits of using the data security and protection programs at both Iron Mountain and Imar would best be summed up as security, integrity and confidentiality.

Because of the confidentiality, Catalano refused to be specific about the various manufacturing, chemical, industrial and securities firms that use the services at Iron Mountain.

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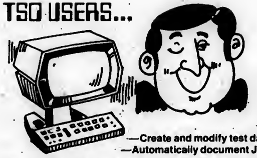

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Claim Antitrust Violations

SPC, Transportation Microwave Suing AT&T

SAN FRANCISCO – Southern Pacific Communications Co. (SPC), a subsidiary of Southern Pacific Co., and Transportation Microwave Corp. have filed a civil antitrust suit against AT&T in the Washington, D.C., federal district court.

The 24 regional Bell telephone operating companies were also named as defendants. They include Pacific Telephone and Telegraph Co., Southwestern Bell Telephone Co., New York Telephone Co. and Illinois Bell Telephone Co.

The suit alleges that AT&T has violated the federal antitrust laws, since SPC's appearance as a competitor in 1973, by restraining trade and by attempting to monopolize telecommunications service. SPC seeks treble damages and orders preventing AT&T from continuing its alleged anticompetitive conduct.

SPC's damages to date may be as much as $200 million, according to a company spokesman.

SPC began operations as a specialized common carrier of voice, data and facsimile communications services to industrial, commercial and government customers in 1973, following Federal Communications Commission (FCC) decisions that encouraged competition with Bell in this field.

SPC's complaint charges that AT&T and subsidiaries illegally combined and conspired to:

- Propose and establish unreasonably low and unjustified rates for Bell's services competing with SPC.
- Refuse interconnections between SPC and Bell companies.
- Delay SPC from competing in the intercity communications market.
- Impose upon SPC arbitrary and discriminatory restrictions to hinder SPC's ability to compete.
- Interfere with SPC's relationship with its customers.
- Engage in a variety of other anticompetitive activities to prevent SPC from competing.

An SPC spokesman noted that many of the activities alleged in SPC's complaint are also involved in a civil antitrust suit filed against AT&T by the Department of Justice in 1974. That suit is also pending in federal district court in Washington, D.C.

Contracts

The Satellite Communications Division of Harris Corp., Melbourne, Fla., has been awarded two contracts for the development of time-division multiple access (TDMA) burst modems by Satellite Business Systems (SBS).

The Computer Research Company of Chicago has been awarded a $1.2 million contract to supply Argonne National Laboratory with computer services in connection with energy research.

Datacrown Ltd. has been awarded a five-year contract with Canada Permanent Trust Co. to provide an expanded DP service.

Scan-Data Corp. of Norristown, Pa., and NCR Corp. have signed an agreement under which Scan-Data will supply optical character recognition equipment to NCR.

Sweda International, a division of Litton Industries, has been awarded a five-year contract for the purchase by Handy Dan Home Improvement Centers, Inc. of Sweda 800/80 Home Center Systems to implement a nationwide point-of-sale merchandising network. The contract has a potential of $10 million.

Honeywell Information Systems, Inc. has begun work on a $998,000 contract by the Minnesota Department of Transportation for installation of a minicomputer-based traffic surveillance and ramp-metering system on Interstate 694 in Minneapolis.

Vermont Research Corp. has signed an OEM contract to supply its Model 4016 head-per-track memories to Taylor Instrument Co. of Rochester, N.Y. Taylor will use the memories in conjunction with its range of process control systems supplied to the textile and petrochemical industries.

Computer Analysts and Programmers (London) Ltd. has been awarded a contract by House of Fraser to assist their computer staff in the analysis, design and implementation of a warehousing system for Wylie and Co. Ltd.

Medical Information Technology, Inc. of Cambridge, Mass., has signed a $190,000 software contract with Strong Memorial Hospital, University of Rochester Medical School, Rochester, N.Y. It will use dual Data General Corp. Eclipse C/330's with more than 70 on-line CRTs and character printers.

Chubb Integrated Systems Ltd. and Philips Data Systems have reached an agreement for Chubb to supply versions of its series of customer-operated terminals for integration with the Philips PTS 6000 terminal system. The terminals provide the bank customer with automatic and secure transactions for cash withdrawals, transfers, deposits and routine inquiries.

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TTL interface	■	■	■	■	■				
Subsystems available	■	■	■	■	■				
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Executive Corner

- James E. Heaton has been appointed marketing director at Process Computer Systems, Inc.
- Joseph J. Sacco Jr. has been appointed vice-president and general manager at the Pulsecom Division of Harvey Hubbell, Inc.
- Jack Gammon has been appointed vice-president of engineering and development at Applied Digital Data Systems, Inc.
- Fred B. Cox has assumed the position of vice-president and general manager for Dynus, Inc.
- Curtis D. Neumann has been named to the position of vice-president of customer services at Dataproducts Corp.
- William Goodale has been appointed vice-president of engineering at Western Peripherals, Inc.
- Sanford Pitch has been appointed vice-president for finance at Durango Systems, Inc.
- Robert A. Camero has been named vice-president for sales at Computer Results, Inc. of Houston.
- Charles D. Daley has been appointed vice-president of finance and treasurer of On-Line Systems, Inc.
- Raymond B. Sepe has been elected to the position of executive vice-president at International Data Sciences, Inc.
- Neville Baynes has been appointed managing director of Inforex Ltd. in the UK.
- Ronald E. Hagan has been named vice-president of the Management Services Division for National Sharedata Corp.
- Werner Simon has been named vice-president of Univac's General Systems Division.
- Douglas C. Altenbern has been named chairman of the board and chief executive officer of NLT Computer Services Corp.
- Patrick L. Shannon has been appointed vice-president for software marketing at International Corp. of Andover, Ma.
- A realignment of the Univac Worldwide Development and Manufacturing organization has resulted in the creation of two new divisions. The realignment provides for a Major Systems Division, headed by vice-president R.C. Phillips, and a General Systems Division reporting to vice-president W. Simon.
- Richard F. Hespos has been named president of Insco Systems of Neptune, N.J.
- J.A. Bertch has joined the Microdata Corp. as vice-president of marketing.
- John J. Chluski and Douglas Stevenson, currently group executives and vice-presidents of ITT Europe, Inc., were elected to the additional posts of vice-presidents of the parent company.
- Art Carroll has joined Petrodata as vice-president of operations.
- Samuel T. Byars has been appointed senior vice-president of marketing at MRI Systems Corp.
- Arthur W. Fonda has been appointed vice-president of operations at Logical Machine Corp.
- Donald L. Courtois has been elected vice-president of manufacturing at International Data Sciences, Inc.
- Kim O. Jones who assumed the presidency of Genasys Systems, Inc. He succeeds C. David Key Jr. who has moved to London as vice-president and director of international operations.
- Donald S. Bates has been promoted to vice-president and general manager of General Electric Co.'s Information Services Division.
- Erik T. Ringkjob has been appointed corporate vice-president and general manager of Storage Technology Corp.'s systems division.
- Sal Intagliata has been named general manager of Perkin-Elmer Corp.'s Wangco division and a vice-president of the corporation's Data Systems Group.
- H. Frederick Koehler has joined SCI Systems, Inc. as corporate vice-president of the computer division.
- James R. Dunathan has been appointed vice-president of marketing at American Information Development, Inc. of San Francisco.
- David F. Sweeney has been appointed vice-president of engineering by Data-Printer Corp.
- H.K. White has been named vice-president of sales/marketing at Ven-Tel, Inc. Peter J. Szeremeta has been named vice-president of engineering and Fran Willes has been appointed national sales manager.
- Terry Wellman has been elected president of GHC, Inc. and Dr. David C. Cordes has been appointed chairman of the board.
- G. Wesley Mayland has been elected vice-president and controller of Datapoint Corp.
- James D. Simonsen has been elected vice-president of industrial relations at Datapoint Corp. John L. Hale has joined Datapoint's Customer Service Division as vice-president for field operations.
- Dennis E. Puckett has been named group vice-president of communications and center operations by National Data Corp.
- George Toor has been appointed vice-president of marketing at Persci, Inc.
- Robert A. Boyle has been named executive vice-president and chief operating officer at Computer Transmission Corp.
- James R. Carreker and Stephen O. James have been promoted to vice-presidents in Datapoint Corp.'s Communications Management Products Division.
- F.L. Harvey has been selected president of Inforex, Inc.
- W. Donald Shaw has been appointed vice-president of personnel at Durango Systems, Inc.
- Stephen J. DeMetrick, Thomas F. Foley and Michael P. Rocchio have been appointed vice-presidents at Information Sciences, Inc.

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Belden Brings Out Data Bus Cables

GENEVA, Ill. — Belden Corp. has introduced a line of data bus cable assemblies that the company said meets the requirements of IEEE Standard 488.

Designed for interfacing computer power supplies with programmable test and measurement instrumentation, the 24-conductor general-purpose interface bus (GPIB) reportedly provides molded-on, 24-contact male/female connectors. Functions performed by GPIB include general interface management, data byte transfer control, input/output and logic and earth grounds, the company said.

As many as 15 programmable devices including counters, signal generators, calculators and digital voltmeters may be interconnected simultaneously, company spokesmen said. Maximum transmission path is 66 ft, Belden added.

Standard GPIB cables are available in 1-, 2-, 4-, 8- and 16-meter lengths and in bulk without connectors. Price for the 2-meter GPIB in quantities of 50 and up is $36 from the firm at 2000 S. Batavia Ave., Geneva, Ill. 60134.

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Zilog Adds 16K by 1-Bit RAM

CUPERTINO, Calif. — Zilog, Inc.has announced a 16K by 1-bit dynamic random-access memory (RAM) that is pin-compatible with Mostek Corp.'s MK 4116 and Intel Corp.'s 2117 dynamic memories.

The Z-6116 MOS RAM also interfaces with Zilog's Z80A CPU circuit and is available in three speed models.

The Z-6116-2 and Z-6116-3 models have cycle times of 375 nsec and access times of 150 and 200 nsec, respectively; the Z-6116-4 has cycle and access times of 410 and 250 nsec.

The Z-6116 can execute delayed write cycles and do page-mode operation and RAM storage-only refresh as well as standard read, write and modify-write cycles.

The Z-6116-2, -3 and -4 are priced at $60, $45 and $39 per unit, respectively, in quantities of 100 to 999.

Zilog, Inc. is located at 10460 Bubb Road, Cupertino, Calif. 95014.

OEM Products

Datel Unveils Acquisition System

CANTON, Mass. — Datel Systems, Inc. has announced a 32-channel analog-to-digital, digital-to-analog (A/D-D/A) data acquisition system that reportedly fits inside the card guides of Motorola, Inc. microcomputers.

The ST-6800 Master A/D-D/A Board for Motorola M6800 and Exorciser micros features paper tape diagnostic/prototyping software and interface hardware.

The ST-6800 accepts 32 single-ended or 16 differential analog input channels and digitzes them to 12-bit binary data words, Datel said, adding that Assembly language program instructions arrange data samples on the 6800 bus in byte pairs.

Additional A/D or D/A expansion boards are available for channel capacity up to 128 A/D and/or D/A channels; 48 A/D or up to 8 D/A channels can be added per board.

The ST-6800 uses memory-mapped I/O architecture, appearing to the CPU as any consecutive block of 512 memory locations, and has a jumper-selected address, the firm said.

The basic ST-6800 board with 16 A/D channels, program and manual only sells for $419 per unit. Datel is at 1020 Turnpike St., Canton, Mass.02021.

Micro Accepts 768 RAM Words

SAN DIEGO — Electronic Product Associates, Inc. has announced an OEM microcomputer system featuring up to 768 words of random-access memory (RAM), optional 2.5K words of programmable read-only memory (Prom) and a teletypewriter/CRT/cassette interface.

The M68-MBC microcomputer system includes a monitor program, keyboard, 6-digit display and mounting frame.

The monitor program allows program loading and execution, system diagnostics and debugging.

The mounting frame accepts three peripheral boards and permits front, back, side or 19-in. rack panel mounting.

The M68-MBC microcomputer system sells for $695 per unit from Electronic Product Associates, Inc., 1157 Vega St., San Diego, Calif. 92110.

Orders & Installations

Weber Marking Systems, Inc. of Arlington Heights, Ill., has ordered an IBM 370/148 with Memorex 3674 disk subsystem, Storage Technology Corp. 3650 tape subsysterm and 3270-equivalent CRTs and control units for the development of on-line oriented marketing, financial and manufacturing applications.

South Coast Data, Inc. of Houston has installed a Burroughs Corp. B1860 system valued at $285,000.

Hoeganaes Corp. has ordered a Univac 90/30 system for installation at the firm's facilities in Riverton, N.J.

First Federal Savings and Loan Association of Waterbury, Conn., has ordered a Burroughs Corp. B1860 valued at $340,000.

The Ira A. Watson Co., a junior department store chain, has ordered a Honeywell Information Level 64 to run an on-line inventory control system.

The College of Business Administration at Georgia State University has ordered minicomputer equipment from Wang Laboratories, Inc. valued at $250,000. The equipment will be used to support teaching and research in the use of small computers by industry and government.

Cincinnati Technical College has ordered a Honeywell Information Systems, Inc. Level 62 system to teach computer operation and programming career fields. The system is valued at $85,000.

Giant Eagle chain stores of Pittsburg, Pa., has installed two Datachecker power management systems from National Semiconductor in an effort to decrease utility charges.

Southeast Contractors Co., Inc. has installed a Honeywell Information Systems, Inc. Level 62 system to run job-cost accounting and a variety of financial-management applications. The system is valued at $144,000.

Bio-Lab, a chemical manufacturing concern headquartered in Decatur, Ga., has ordered a Univac 90/30.

Edgewater Data Processing, Inc. has installed a Honeywell Information Systems, Inc. Level 62 to run a variety of financial management applications. The system is valued at $194,000.

The town of Shaler, Pa., has ordered a Univac 90/25 to expedite its local government operations.

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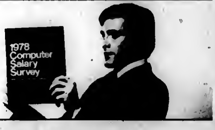

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COMMUNICATIONS

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- Utilities
- Data Management/Job Management
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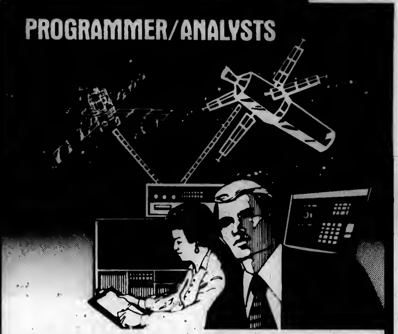

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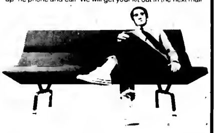

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We are now operating on a MULTIMEG IBM 370/158 supporting a heavy teleprocessing network using OS/VS1, CICS/VS, COBOL, DELTAK TRAINING COURSES, TOTAL DATA-BASE, DATA ANALYZER, ON-Line PROGRAMMING, OPTICAL SCANNING, COM, HIPO AND OTHER NEW TECHNOLOGIES.

If you have a minimum of 2 years solid experience and seek further growth potential, please send us a resume stating salary requirements to:

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Our Business Systems Department needs responsible people to assist in the development of financial, engineering, manufacturing, product assurance, and materiel systems. These openings are in a data base environment and processing is being changed from batch to on-time.

Education requirements include a BS in Business, Mathematics, Computer Science or work experience equivalent.

PROGRAMMERS - one to three years' experience.

PROGRAMMER ANALYSTS - two to five years' experience.

Salaries are commensurate with experience. Send resume with salary history/requirements to Professional Employment, Dept. BAR-B.

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If you're more than a beginner . . .
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We offer a competitive starting salary and complete company benefits in a pleasant recreational community in suburban Grand Rapids, Michigan. If you would like the opportunity to further develop your skills in this challenging growth position, forward your resume with salary requirements to the attention of B. Jourdan, in our corporate Human Resources Division.

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(907) 344-2585

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Plans and directs all activities of university computer center. Represents the center in discussions with other campus units and systemwide Chancellor's Office. Required qualifications: five years progressively responsible experience in data processing, including three years managing all phases of a DP installation (experience with large data bases and large-scale timesharing systems desirable); equivalent to graduation from a four-year college or university (advanced degree preferred). Salary $25,644 - $30,984. Send letter, resume, names of three references to Phillip Wasley, Dean, Educational Resources, California State University Dominguez Hills, Carson, CA 90747. Applications must be received by May 15, 1975. Approximate appointment date: June 1, 1978. Equal Opportunity/Affirmative Action Employer.

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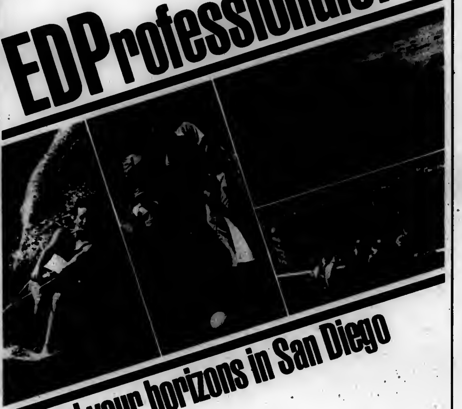

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Michigan State University

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Qualifications on CDC CYBER computers for these positions include:

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Send your resume and salary history to the Personnel Office, Michigan State University, 110 Nisbet Building, East Lansing, Michigan 48824, no later than May 19, 1978.

Michigan State University is an equal opportunity employer and eagerly seeks all qualified people.

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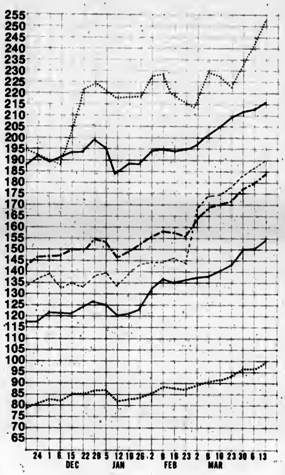

Earnings Reports

DATA 100
Year Ended Dec. 31

	1977	1976
Shr Ernd	$1.19	$1.43
Revenue	138,129,000	121,939,000
Tax Cred	517,000	1,750,000
Earnings	8,094,000	6,435,000
3 Mo Shr	.40	55
Revenue	41,759,000	34,042,000
Tax Cred	39,000	892,000
Earnings	2,537,000	2,810,000

AT&T
Three Months Ended Feb. 28

	1978 (000)	e1977 (000)
Shr Ernd	$1.80	$1.52
Revenue	9,974,729	8,558,187
Earnings	1,219,066	981,487
12 Mo Shr	7.19	6.24
Revenue	37,228,711	33,419,383
Earnings	4,701,422	3,963,635

e-Restated.

APPLIED DATA RESEARCH
Year Ended Dec. 31

	1977	e1976
Shr Ernd	$1.19	$1.11
Revenue	18,930,241	12,812,811
Disc Op	(146,469)	103,448
Tax Cred	.....	384,000
Earnings	1,636,531	1,440,164

e-Restated.

INFORMATION MAGNETICS
Year Ended Dec. 31

	1977	e1976
Shr Ernd	....	$1.03
Revenue	$32,166,000	30,066,000
Disc Op Loss	1,199,000	649,000
Tax Cred	.....	46,000
Earnings	(484,000)	1,872,000

e-For 53 weeks; restated to reflect discontinued operations.

NATIONAL DATA
Three Months Ended Feb. 28

	1978	1977
Shr Ernd	$.18	$.14
Revenue	8,972,000	e7,849,000
Earnings	796,000	815,000
9 Mo Shr	.51	.37
Revenue	26,302,000	a22,405,000
Earnings	2,261,000	1,667,000

e-Restated.

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Bill Healey
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Los Angeles, Calif. 90024
Phone: (213) 475-8486

San Francisco
Bill Healey
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Japan
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Telex: J2424461

United Kingdom
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London NW1 9PF
England
Phone: (01) 267-1201
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West Germany
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COMPUTERWORLD GmbH
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Computerworld Stock Trading Summary

CLOSING PPICES NEONESDAY, APRIL 12, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTENS

EPCH		PPICE 1977-78 RANGE (1)	CLOSE APR 12 1978	NEEX NET CHNGE	NEEX PCT CHNGE
A	AMDAHL COPP	22- 55	46	- 3/4	-1.8
N	BURPOUGHS CORP	55- 91	59 3/4	- 1/4	-0.4
C	COMPUTEB AUTOMATION	18- 30	25 3/8	- 1/8	-0.4
N	CONTPOL OATA COPP	20- 29	27 1/8	+1 1/2	+5.8
O	CPAY PESEAPCH INC	15- 35	35 1/4	+3	+9.3
N	OATA GENEPAL COPP	35- 54	40 3/8	- 3/8	-0.8
N	OATAPOINT COPP	18- 43	43	+1 1/8	+2.8
N	DIGITAL EQUIPNENT	37- 53	38 7/8	-1 1/8	-2.8
N	ELECTPONIC ASSOC.	2- 5	4	- 3/8	-8.5
A	PLECTPONIC ENGINEER.	8- 16	15 3/8	+ 3/4	+5.1
O	EOUP-PHASE SYSTENS	13- 25	24 1/2	+2 5/8	+12.0
A	POPBUPO	28- 54	33	- 3/4	-2.2
O	GENEPAL AUTOMATION	6- 9	9	+1	+12.5
C	GPI COMPUTEP COPP	1- 1	1 1/8	0	0.0
N	HENLETT-PACKAPO CO	62- 87	64 5/8	+ 1/4	+0.3
N	HONEYNELL INC	43- 55	45 1/4	+ 1/2	+1.1
N	IBP	236-286	236 1/4	-5 1/8	-2.1
C	MANAGENENT ASSIST	5- 14	14	+1 5/8	+13.1
O	MICPODATA COPP	7- 18	10 1/8	-1 3/8	-11.9
O	NINI-CONPUTEP SYST	5- 12	5 3/4	- 1/4	-4.1
O	MODULAR COMPUTER SYS	5- 12	12	+ 7/2	+4.3
N	MCP	32- 47	44 3/8	- 1/2	-1.1
C	PPIME COMPUTEP INC	12- 32	30 5/8	+1	+3.3
N	PEPKIN-ELMEP	17- 22	17 1/2	- 5/8	-3.4
N	PAYTHEON CO	16- 38	37 5/8	+1 3/8	+3.7
N	SPEPPY PAND	30- 42	35 5/8	+ 3/4	+2.1
O	SYCOR INC	8- 21	21 3/8	+ 3/4	+3.6
A	SYSTENS ENG. LABS	5- 14	12 1/4	- 1/4	-2.0
A	NANG LABS.	10- 16	15 5/8	- 1/4	-1.5

LEASING CONPANIES

EPCH		PPICE 1977-78 RANGE (1)	CLOSE APR 12 1978	NEEX NET CHNGE	NEEX PCT CHNGE
O	ALANTHUS COPP	3- 6	5 3/4	0	0.0
C	BOOTHE COUPIEP COPP	8- 18	16 5/8	+ 1/8	+0.7
O	COMOISCO INC	9- 16	12	+2 1/2	+26.3
A	CONNEPCE GPOUP CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	+ 1/8	+27.1
M	OATPONIC RENTAL	0- 2	1 7/8	+ 1/8	+7.1
A	DCL INC	1- 4	2 3/4	+ 1/8	+4.7
N	OPP INC	6- 10	9	+ 1/8	+1.4
N	ITEL	13- 22	18 3/4	+ 5/8	+3.4
N	LEASCO COPP	19- 32	31 5/8	+1 1/2	+4.9
O	LTASPAC COPP	1- 2	1 5/8	- 1/8	-7.1
A	PIONEEP TEP COPP	5- 11	5 7/8	- 1/4	-4.0
N	U.S. LEASING	10- 16	13	0	0.0

EXCH: N=NEW YOPK; A=ANERICAN; P=PHIL-BALT-WASH
L=NATIONAL; N=MIONEST; O=OVEP-THE-COUNTEP
O-T-C PRICES APE BIO PRICES AS OF 3 P.M. OP LAST BIO
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SOETWAPE & EOP SERVICES

EXCN		PRICE 1977-78 PANGE (1)	CLUSE APP 12 1978	WEEP NET CHNGE	WEEP PC7 CHNGE
C	ACVANCED CUMP TECH	3- 2	1	- 1/8	-11.1
O	ANACOMP INC	7- 12	9 7/8	- 1/4	-2.4
A	APPLIED DATA PES.	5- 11	10 1/2	+ 7/8	+9.0
N	AUTOMATIC DATA PPOC	23- 30	26 3/4	-1 1/4	-4.4
O	COLEMAN AMEPICAN COS	1- 2	1 3/8	+ 1/8	+10.0
C	COMPU-SEPV NETWOPX	9- 15	8 1/2	- 3/4	-8.1
O	COMP ELECTION SYSTMS	6- 10	9 1/8	+ 1/8	+1.3
C	COMPUTEP HOPIZONS	1- 2	2 1/4	0	0.0
C	COMPUTEP NETWOPX	9- 11	8 3/4	+ 1/4	+2.9
N	COMPUTEP SCIENCES	7- 11	10	- 3/8	-3.8
C	COMPUTEP TASK GROUP	1- 2	2	0	0.0
C	COMPUTEP USAGE	1- 3	2 3/8	- 3/8	-13.6
O	CONSHAPE	5- 11	10 3/4	+1	+10.2
C	DATA DIMENSIONS INC	3- 5	4 1/2	0	0.0
O	OATATAB	1- 2	1 1/4	0	0.0
N	ELECTPONIC DATA SYS.	14- 20	17 1/2	0	0.0
O	INSYTE CORP	2- 3	1 1/2	0	0.0
C	IPS CONPUTEP NAPKET.	1- 2	2 1/4	0	0.0
C	XEANE ASSOCIATES	3- 4	3 3/8	- 1/8	-3.3
O	PEYDATA COPP.	1- 3	2 1/8	+ 3/8	+21.4
A	LOGICON	7- 17	13 3/8	+ 3/8	+2.8
A	MANAGEMENT DATA	1- 2	1	0	0.0
A	NATIONAL CSS INC	10- 19	18 1/4	- 3/8	-2.0
O	NATIONAL DATA COPP	4- 9	8 7/8	+ 3/8	+4.4
A	ON LINE SYSTENS INC	16- 24	22 7/8	- 3/4	-3.1
A	PLANNING PESEARCH	3- 6	5	- 1/8	-2.4
O	PPOGRAMMING & SYS	7- 1	3/4	0	0.0
C	PAPIDATA INC	2- 4	3 7/8	+ 1/8	+3.3
O	PEYNOLDS & PEYNOLD	17- 23	22 1/2	+1 1/2	+7.1
C	SCIENTIEIC COMPUTEPS	1- 4	4	- 1/8	-3.0
C	TYMSHAPE INC	14- 23	20 7/8	+ 7/8	+4.3
A	UPS SYSTEMS	4- 6	5 7/8	0	0.0
A	WYLY COPP	1- 5	5	+1 5/8	+48.1

PEPIPHEPALS & SUBSYSTENS

EXCN		PRICE 1977-78 PANGE (1)	CLUSE APP 12 1978	WEEP NET CHNGE	WEEP PC7 CHNGE
N	AUDPESSOGPAPH-MULT	10- 19	16 1/2	+1 1/8	+6.4
O	ADVANCED MEMOPY SYS	7- 10	10 1/8	- 1/4	-2.4
A	APPEX COPP	8- 13	13	+ 5/8	+5.0
O	ANDEPSON JACOBSON	3- 6	5 3/4	0	0.0
N	APPLIED DIG DATA SYS	10- 20	14 1/2	+ 1/2	+3.5
O	BEEHIVE INT'L	5- 12	5 3/8	- 1/4	-4.4
A	BOLT, BEPANEP & NEW	6- 9	7 3/4	+1 3/8	+21.5
N	BUNKEP-PAMC	8- 14	13 3/4	- 1/8	-0.9
A	CALCOMP	3- 5	5	+ 3/8	+8.1
C	CAMBPIDGE MEMOPIES	1- 4	3 7/8	+1 1/4	+47.6
N	CENTPONICS DATA COMP	16- 30	19	- 3/4	-3.7
O	COGNITPONICS	1- 1	3/4	0	0.0
C	COMPUTEP COMMUN.	5- 8	9	- 1/8	-1.3
O	COMPUTEP CONSOLES	4- 7	6	- 1/4	-4.0
A	COMPUTEP EQUIPNENT	2- 4	4	+ 1/8	+3.2
C	COMPUTEP TPANSCEIVER	1- 1	1 1/2	0	0.0
C	CONTEN	9- 15	14 1/8	- 1/4	-1.7
A	CONPAC COPP	19- 28	20 3/8	+ 7/8	+4.4

EPCN		PPICE 1977-78 PANGE (1)	CLOSE APP 12 1978	WEEP NET CHNGE	WEEP PC7 CHNGE
C	DATA ACCESS SYSTEMS	4- 5	4 1/2	0	0.0
O	DATA 100	8- 12	11 5/8	- 3/8	-3.1
A	DATA PRODUCTS COPP	9- 19	15 7/8	0	0.0
O	DATA TECHNOLOGY	3- 4	4	- 1/4	-5.8
O	DATUM INC	1- 4	1 3/4	+ 1/4	+7.1
O	DECISION DATA COMPUT	2- 3	1 3/4	- 1/8	-6.6
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
A	DOCUMATION INC	8- 13	12 1/2	+ 7/8	+7.5
C	CATARAM COPP	2- 24	17	+ 1/2	+3.0
N	ELECTPONIC M & M	4- 5	5 1/8	- 1/8	-2.3
O	FABRI-TEX	1- 2	1	0	0.0
O	GENEPAL COMPUTEP SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE COPP	8- 15	12 5/8	- 1/8	-0.9
N	HAPPIS CUPP	28- 48	47 1/4	- 1/8	-0.2
O	IMEOPEP INC	4- 8	7 1/8	- 3/8	-5.0
C	INFORMATION INTL INC	8- 14	10	0	0.0
O	INTEL COPP	38- 57	44 1/2	+1	+2.2
A	LUNDY ELECTPONICS	3- 8	4	0	0.0
O	MSI DATA CORP	6- 15	12 3/8	- 5/8	-4.8
A	NEMOPEX	23- 38	35	+2 1/2	+7.6
A	MOHAWK DATA SCI	5- 9	8 5/8	- 3/8	-4.1
O	PENPIL CORP	2- 8	8	+ 1/4	+3.2
N	PIPTEC COPP	7- 12	11 1/4	+1 1/8	+11.1
A	POTTEP INSTPUMENT	2- 2	1 3/4	0	0.0
O	PPECISION INST.	2- 2	2	0	0.0
C	QUANTOP COPP	3- 5	2 7/8	0	0.0
O	PECOGNITION EQUIP	8- 10	7 1/2	- 1/2	-6.2
C	SCAN DATA	1- 2	1 7/8	- 1/4	-11.7
O	STOPAGE TECHNOLOGY	10- 31	27 3/8	-3 1/4	-10.6
O	T BAR INC	7- 19	19 1/4	+3 3/4	+24.1
O	TALLY CORP.	4- 9	8 5/8	+1 1/4	+16.9
A	TEC INC	6- 10	7	+ 1/8	+1.8
N	TEKTPONIX INC	29- 40	36 1/4	+2	+5.8
N	TELEX	2- 5	4 3/8	+ 1/4	+6.0
O	TESDATA SYSTEMS CP	13- 20	15 3/4	+ 1/4	+1.6
C	WILTEX INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSOPIES

EPCN		PPICE 1977-78 PANGE (1)	CLOSE APP 12 1978	WEEP NET CHNGE	WEEP PC7 CHNGE
A	AMERICAN BUS PPODS	6- 8	8 3/8	+ 3/8	+4.6
O	PALTIMOPE BUS FOPMS	1- 4	2 7/8	0	0.0
A	BARRY WPIGHT	10- 19	19	+1 1/8	+6.2
O	CYBEPNATICS INC	1- 1	7/8	0	0.0
C	DUPLEX PPODUCTS INC	14- 21	21	+1 1/2	+7.6
N	ENNIS BUS. FOPMS	6- 11	11 3/8	+ 1/8	+1.1
N	3M CONPANY	43- 56	44 1/2	+1 1/4	+2.8
C	MOOPE CORP LTD	24- 37	29 1/4	- 1/4	-0.8
N	NASHUA COPP	16- 28	24 1/8	- 3/4	-3.0
C	STANDARD PEGISTEP	18- 25	23	0	0.0
C	TAB PPODUCTS CO	8- 19	9 3/8	+ 7/8	+10.2
N	UARCO	18- 24	24	+ 1/8	+0.5
A	WAPASH MAGNETICS	10- 15	12 5/8	0	0.0
N	WALLACE BUS EOPMS	17- 22	21 1/2	+ 7/8	+4.2

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- Complete Federal income tax forms
- Maintain realistic insurance values
- Project depreciation for budgeting and cash flow analysis

The MSA Fixed Assets Accounting System, as well as MSA's other systems, interfaces with the MSA General Ledger System.

For more information about the MSA Fixed Assets Accounting System or any of the MSA's complete line of financial systems, call Carole McConnell at (404) 262-2376, or return this coupon.

MSA
THE FINANCIAL SOFTWARE COMPANY

Management Science America, Inc.
3445 Peachtree Road, N.E., Dept. C-1
Atlanta, Georgia 30326
(404) 262-2376

Chicago (312) 986-2450
Los Angeles (213) 822-9766
New York (201) 871-4700

International Agent:
MSA International, Inc.
Brussels, Belgium Tel. (02) 673 99.63
Telex: 63020 Answerback: MSA B

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